

SCIENTIFUR
ISSN 0105-2403
VOL. 11, No. 1
FEBRUARY 1987

CONTENTS

1.	CONTENTS	1
2.	NOTES	14
3.	<u>MULTIDISCIPLINARY</u>	
	BIOAVAILABILITY, PROPHYLACTIC AND THERAPEUTIC VALUE OF ERYTHROWET.	16
	Stanislaw Woloszyn, Zbigniew Gradzki, Stanislaw Winiarczyk. Code 8-9-12-M-F-0.	
	MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS OF MUSKRATS FROM THREE DIFFERENT PHYSIOGRAPHIC REGIONS OF MARYLAND, USA.	16
	Elizabeth E. Zucker, J.A. Chapman. Code 2-3-0.	
	AGE DETERMINATION AND MORPHOLOGICAL CHARACTERISTICS OF WILD MINK FROM MARYLAND, USA.	17
	G.R. Askins, J.A. Chapman. Code 2-14-M.	
	AGE DETERMINATION, REPRODUCTION, AND MORTALITY OF THE GRAY FOX (UROCYON CINEREOARGENTEUS) IN MARYLAND, USA.	17
	R.A. Wigal, J.A. Chapman. Code 1-5-10-F.	
	THE STATUS, POPULATION CHARACTERISTICS AND HARVEST OF THE RIVER OTTER IN MARYLAND.	18
	Elmer E. Mowbray, Duane Pursley, Joseph A. Chapman. Code 1-14-0.	

MOVING ACTIVITY OF FERRET IN A T-TYPE LABYRINTH.	19
J. Rafay, V. Parkányi, M. Barta, I. Jakubicka. Code 11-10-0.	
INCIDENCE OF DEVELOPMENTAL DISORDERS IN NUTRIA.	19
W. Scheuring. Code 2-4-14-0.	
SOME OBSERVATIONS ON MARTEN.	20
Erling Kvalheim. Code 1-11-0.	
THE PRODUCTION CHARACTERISTICS OF FITCH (MUSTELA PUTORIUS).	21
K.H. Giles. Code 5-4-14-0.	
LABORATORY METHODS FOR EVALUATION OF THE PHYSIOLOGICAL STATE OF FUR ANIMALS.	21
V.A. Berestov. Code 3-14-M-F-0.	
ENZYMOLOGICAL METHODS OF EVALUATION OF PHYSIOLOGICAL STATUS IN FUR ANIMALS.	22
L.K. Kozevnikova. Code 3-14-M-F-0.	
SIGNIFICANCE OF HEMATOLOGICAL AND BIOCHEMICAL TESTS IN FUR ANIMAL CLINICS.	22
J. Konrád. Code 3-2-M-F-0.	
SOME INDICATORS OF THE METABOLIC PROFILE OF BLOOD OF RACCOON DOGS (NYCTEREUTES PROCYONOIDES).	22
Stanislaw Wójcik, Zbigniew Bialkowski, Leon Saba. Code 3-2-0.	
STUDIES INTO THE MORBIDITY OF MINKS ON FUR ANIMAL RANCHES IN SLOVAKIA FROM 1976-1979.	23
J. Knezik, E. Svicky, F. Lešnik, Z. Koppel, P. Dvonc, A. Hladik. Code 9-M-F-0.	
INFLUENCE OF DIFFERENT CONDITIONS OF HOUSING ON INCIDENCE OF SOME MOST FREQUENT DAMAGES IN NUTRIA FUR.	24
I. Tocka. Code 12-10-0.	
EXPERIENCES OF EFFECTS OF INDUSTRIAL SYSTEMS OF NUTRIA BREEDING ON THEIR PERFORMANCE UNDER CONDITIONS OF FARM BREEDING.	24
J. Kuzma, J. Brotan. Code 12-14-0.	
THE ESTIMATE OF TECHNICAL EQUIPMENT OF FOX FARMS IN POLAND.	25
A. Frindt. Code 12-14-M-F-0.	
A STUDY OF THE DUODENAL GLANDS OF THE MINK.	25
Kazushige Takehana, Mitsuo Abe. Code 2-M.	

QUANTITATIVE AND QUALITATIVE HISTOLOGICAL STUDY ON STANDARD NUTRIA AGED 5 AND 8 MONTHS.	25
M. Miclea, Cornelia Duca, Z. Papay. Code 2-0.	
HISTOLOGICAL STRUCTURE OF THE HAIR FROM THE POINT OF VIEW OF THE FUR QUALITY.	26
A. Galatik. Code 2-M-F-0.	
MORPHOFUNCTIONAL ADAPTATIONS OF SABLE SKELETON UNDER CONDITIONS OF INDUSTRIAL BREEDING.	26
N.A. Slesarenko. Code 1-2-0.	
THE LIPID COMPOSITION OF LYSOSOMES IN THE LIVER OF ARCTIC FOXES.	26
E.I. Lizenko, O.M. Bolgova, S.I. Gur'yanova. Code 3-F.	
FUNCTIONAL ANALYSIS OF THE RELATIVE LENGTH OF SPINE SECTIONS OF MUSTELIDS MAMMALIA MUSTELIDAE.	27
O. Ya Pilipchuk. Code 2-0.	
VERTEBRA LENGTH CHANGES IN MOMENTS OF RESISTANCE OF VERTEBRAL BODIES IN PREDATORY MAMMALS.	27
O. Ya Pilipchuk. Code 2-0.	
RESPONSIBILITIES OF VETERINARY SERVICES FOR GOOD FUR ANIMAL HEALTH.	28
U.D. Wenzel, J. Hartung. Code 9-14-M-F-0.	
A COMPARISON OF PELT PRODUCTION IN THE NORDIC COUNTRIES.	28
Kristian Fjeldin. Code 13-M-F-0.	
DOMESTIC SOURCES OF FURS.	28
R. Janda. Code 14-M-F-0.	
THE EVALUATION OF FUR ANIMAL ECONOMY IN SLOVAK FARMS.	29
D. Sekerka. Code 13-14-M-F-0.	
THE FUR ANIMAL BREEDING AND ITS DEVELOPMENT WITH MEMBERS OF THE SLOVAK UNION OF BREEDERS.	29
J. Kubán. Code 13-14-M-F-0.	
THE EVALUATION OF THE ACTIVITIES IN THE CO-OPERATIVE ASSOCIATION FOR THE FUR ANIMAL BREEDING IN SLOVAKIA IN THE YEARS OF THE 7th 5-YEAR PLAN.	30
S. Zatko. Code 14-M-F-0.	
CONDITIONS AND PROSPECTS OF THE FUR ANIMAL BREEDING IN POLAND.	30
K. Klimowicz. Code 13-14-M-F-0.	

**POSSIBILITIES OF THE DEVELOPMENT OF FUR ANIMALS
BREEDING IN YUGOSLAVIA.**

30

A. Dudas.

Code 14-13-M-F-0.

Titles of other publications - not abstracted.

Care and feeding of foxes during parturition and lactation.

H. Konnerup-Madsen. (Dansk Pelsdyravt, 48, 3, 199-200, 1985)
(DANH). Code 12-14-F.

**Comparative Feeding Habits of Red Foxes (*Vulpes vulpes*) and
Gray Foxes (*Urocyon cinereoargenteus*) in Maryland.**

J. Gregory Hockman, Joseph A. Chapman. (American Midland
Naturalist, 110, 2, 276-285, 1983). Code 1-10-11-F.

**Age determination and population characteristics of red foxes
from Maryland.** B.B. Nelson, J.A. Chapman. (Z. Säugetierkd.
47, 296-311, 1982). Code 1-F.

**Reproduction, physiological responses, age structure and food
habits of raccoon in Maryland, USA.** J.P. Dunn, J.A. Chapman
(Z. Säugetierkd., 48, 161-175, 1983). Code 1-5-10-11-0.

**Age determination and mortality of the nutria (*Myocastor coy-
pus*) in Maryland, USA.** G.R. Willner, K.R. Dixon,
J.A. Chapman. (Z. Säugetierkd., 48, 19-34, 1983).
Code 1-5-10-0.

The least weasel, *Mustela nivalis*, from Maryland.

Joseph A. Chapman, Dan M. Harman. (Proc. of Pennsylvania
Acad. of Sci., 51, 91-92, 1977). Code 1-0.

Recent records of bobcats (*Lynx rufus*) from Maryland.

(Proc. from Pennsylvania Acad. of Sci., 51, 185-186, 1977).
Code 1-14-0.

**Preliminary observations on otter distribution and habitat
preferences in Maryland with descriptions of otter field sign.**

Elmer E. Mowbray, Jr., Joseph A. Chapman, James R. Golds-
berry. (33rd Northeast Fish and Wildlife conf., April 1976,
125-131). Code 1-10-11-0.

***Ondatra zibethicus*.** Gale R. Willner, George A. Feldhamer,
Elizabeth E. Zucker, Joseph A. Chapman. (Mammalian Species,
141, 1-8, 1980). Code 1-10-11-14-0.

**Seasonal home range and habitat utilization of raccoons in
Maryland.** Frederick C. Sherfy, Joseph A. Chapman.

(Carnivore III (3), 8-18, 1980). Code 1-10-11-0.

**A study and review of muskrat food habits with special refe-
rence to Maryland.** Gale R. Willner, Joseph A. Chapman,
James G. Goldsberry. (Maryland Wildlife Administration, Publ.

in wildlife Ecology No.1, 1975). Code 1-10-11-0.

Data on the biology of *martes martes foina intermedia* in

Tadzhik-SSR. A.I. Sokov. (Izv. Akad. Nauk. Tadzh SSR Otd.
Biol. Nauk, 3, 91-97, 1972). (RUSS) Code 1-10-11-0.

**A model for predicting age-specific body weights of nutria
without age determination.** Gale R. Willner, Kenneth R.

Dixon, Joseph A. Chapman, Jay R. Stauffer, Jr. (J.Appl.Ecol.
7, 343-347, 1980). Code 14-2-1-0.

Harmonic mean measure of animal activity areas.

Kenneth R. Dixon, Joseph A. Chapman. (Ecology, 61, 5, 1040-1044, 1980) Code 11-14-M-F-0:

Eco-ethology of the red fox (*Vulpes vulpes* L.) in Southern Belgium. 1. Alimentary diet. A. Iokem. (Ann. Med.Vet., 129, 309-318, 1985). Code 1-11-10-F. (FREN).

Eco-ethology of the red fox (*Vulpes vulpes* L.) in Southern Belgium. 2. Choice of den location. A. Iokem. (Ann. Med. Vet., 129, 319-328, 1985). Code 1-11-10-F. (FREN).

Central place foraging by beavers (*Castor canadensis*):

a test of foraging predictions and the impact of selective feeding on the growth form of cottonwoods (*Populus fremontii*)

Mark A. McGinley, Thomas G. Whitham. (Oecologia, Berlin, 66, 558-562, 1985). Code 1-10-11-0.

Effects of trapping and weather on body weights of feral nutria in Maryland. Kenneth R. Dixon, Gale R. Willner, Joseph A. Chapman, William C. Lane, Duane Pursley.

(J. of Applied Ecology, 16, 69-76, 1979). Code 10-11-2-1-0.

Farmborn injuries in fur bearing animals and its animal welfare lawful valuation. H.-C. Löliger. (Landbauforsch. Völkenrode, 35, 1, 37-39, 1985). (GERM). Code 6-12-14-M-F-0.

Peculiarities of intrauterine formation of skeletal muscles in coypu. Russian Azerbaijani. N.M. Akhmedov.

(Izvestiia Akad. Nauk Azerbaidzhanskoi SSR, Seriya biolog. nauk. Baku "Elm", 6, 56-60, 1983). (RUSS). Code 2-0.

Pedigree work with nutria. Lithuanian Russian.

A. Varnaginis. (Darbai - Lietuvos Vet. akad. Kaunas Akad. 16, 60-65, 1984). (RUSS). Code 14-0.

Polydactyly in *Myocastor coypus*. Gale R. Willner, Joseph A. Chapman. (Virginia J. of Science, 28, 3, 1977). Code 2-0.

Differential survival rates among leg-trapped and live-trapped nutria. Joseph A. Chapman, Gale R. Willner, Kenneth R. Dixon, Duane Pursley. (J. Wildl.Manage. 42, 4, 1978.)

Code 14-0.

4. GENETICS

CHROMOSOMAL POLYMORPHISM IN THE BLUE FOX (*ALOPEX LAGOPUS*) AND ITS EFFECTS ON FERTILITY.

32

O.M. Møller, N.N. Nes, M. Syed, J.A. Fougner, K. Norheim, A.J. Smith.

Code 4-5-F.

A SYMMETRY AND RESOLUTION OF THE SYNAPTONEMAL COMPLEX IN THE XY PAIR OF CHINCHILLA LANIGER.

32

A.J. Solari, M.I. Rahn.

Code 4-0.

INFLUENCE OF NORWEGIAN TYPE BLUE FOX MALES ON SOME PERFORMANCE FEATURES OF DOMESTIC POPULATION.

33

M. Starek.

Code 4-14-F.

- GENETIC RELATIONSHIP OF CHANGES IN THE STANDARD COLOUR OF SILVER-BLACK FOXES (SPOTS AND STARS) TO DOMESTICATION.** 33
D.K. Belyaev, L.N. Trut.
Code 4-11-F.
- NUCLEAR AND NUCLEOLAR VOLUMES IN ADRENAL RETICULAR ZONE OF WILD AND DOMESTIC SILVER FOXES VULPES FULVUS UNDER DIFFERENT LIGHTING REGIMES.** 33
N.D. Lutsenko, L.N. Ivanova.
Code 5-2-11-F.
- RELATIVE HYPERTROPHY OF THE RIGHT VENTRICLE OF THE HEART IN SILVER-BLACK FOXES SELECTED FOR TAMENESS.** 34
N.K. Eriskovskaya, T.A. Leont'eva, Yu G. Tsellarius, L.N. Trut, D.K. Belyaev.
Code 4-11-2-F.
- HOMOLOGY OF CHEDIAK-HIGASHI SYNDROME IN HUMANS, CATS, AND MINK.** 35
J.D. Penner, D.J. Prieur.
Code 4-9-M-F-O.
- USE OF THE WHITE ARCTIC FOX IN FOX BREEDING.** 35
Einar J. Einarsson.
Code 4-F.

Titles of other publications -not abstracted.

Subchromosomal localization of eight genes on the second chromosome of the American mink (*Mustela vison*).
N.S. Zhdanova, A.A. Gradov, N.B. Rubtsov, O.L. Serov.
(Translated from Doklady Akademii Nauk SSR, 280, 5, 1250-1253, 1985 by Plenum Publ. Corp, 0012-4966/85/0102.) (ENGL)
Code 4-M.

The standard karyotype of the blue fox (*Alopex lagopus* L.).
Auli Mäkinen. (Hereditas, 103, 33-38, 1985). Code 4-F.

The standard karyotype of the silver fox (*Vulpes fulvus* Desm.).
Auli Mäkinen. (Hereditas, 103, 171-175, 1985).
Code 4-F.

5. REPRODUCTION

- PLASMA-PROGESTERONE-ASSAY, A PRACTICAL METHOD FOR OVULATION DETECTION IN BLUE FOX (*ALOPEX LAGOPUS*).** 36
H.A.P. Urlings, P.N.G.M. van Beek, H.M.J.F. van der Heijden.
Code 5-F.
- ARTICOP METHOD FOR ARTIFICIAL INSEMINATION OF FOXES.** 40
Seppo Pasanen.
Code 5-F.
- HALF-LIFE OF FSH AND LH IN THE FERRET.** 44
B.T. Donovan, B. Gledhill.
Code 3-5-0.
- HETEROLOGOUS ANTI-PROGESTERONE MONOCLONAL ANTI-BODY ARRESTS EARLY EMBRYONIC DEVELOPMENT AND IMPLANTATION IN THE FERRET (*MUSTELA PUTORIUS*).** 44
V. Rider, R.B. Heap.
Code 5-3-0.

- CHANGES IN SERUM PROLACTIN CONCENTRATIONS AND OVARIAN PROLACTIN RECEPTORS DURING EMBRYONIC DIA-PAUSE IN MINK.** 45
 Jack Rose, James E. Oldfield, Fredrick Stormshak.
 Code 5-3-M.
- THE USE OF THE GONADOTROPIC HORMONES AT THE CO-PULATION OF THE MINKS.** 46
 A. Sidlovský.
- METHOD OF SEMEN COLLECTION IN NUTRIA MALES BY ELECTROEJACULATION.** 46
 M. Barta, I. Jakubicka.
 Code 5-0.
- POSSIBILITIES OF PRACTICAL USE OF RIA-METHODS IN CONTROL OF REPRODUCTION PROCESS IN FUR ANIMALS.** 47
 J. Nitray, I. Jakubicka, M. Barta, V. Parkányi, J. Rafay.
 Code 3-5-M-F-0.
- USE OF SOME BIOTECHNOLOGICAL METHODS IN FOX BREEDING.** 47
 M. Barta, I. Jakubicka.
 Code 5-F.
- METHODS OF DETERMINATION OF OESTRUS IN BLUE FOX (ALOPEX LAGOPUS).** 48
 O. Szeleszczuk.
 Code 5-F.
- SOME PROBLEMS OF SPERM LIVABILITY IN EJACULATE OF BLUE FOX (ALOPEX LAGOPUS).** 48
 J. Sabrnak.
 Code 5-F.
- CHARACTERISTICS OF THE NUTRIA EJACULATE AFTER RE-MOVAL OF THE SEMINAL VESICLES.** 48
 I. Jakubicka, M. Barta.
 Code 5-0.
- MATING METHODS FOR BIG AND SMALL FARMS OF FOXES AND MINKS.** 49
 J. Maciejowski.
 Code 5-12-M-F.
- INCIDENCE OF A CIRCADIAN CYCLE OF PHOTSENSITIVITY IN THE REGULATION OF THE ANNUAL TESTIS CYCLE IN THE MINK: A SHORT-DAY MAMMAL.** 49
 Line Boissin-Agasse, Jean Boissin.
 Code 5-2-3-10-M.
- REPRODUCTIVE CAPACITY IN MALE MINK AFTER LONG DISTANCE TRANSPORTATION IN PREGNANT FEMALES.** 50
 Ch. Sundqvist, A. Lukola, M. Valtonen.
 Code 5-14-M.
- EFFECTS OF 6-MBOA ON REPRODUCTIVE FUNCTION IN PONIES, MICE, RATS AND MINK.** 50
 O.J. Ginther, D.R. Bergfelt, S.T. Scraba, P.R. Pivonka, L.C. Nuti.
 Code 5-3-M-0.

- THE INFLUENCE OF CHROMOSOMAL POLYMORPHISM ON FERTILITY IN FOX.** 51
V. Parkányi, I. Jakubicka, J. Rafay.
Code 4-5-F.
- THE INFLUENCE OF CLIMATE CONDITIONS ON THE MATING TIME IN BLUE FOXES.** 51
F. Kukla.
Code 10-5-F.
- REPRODUCTION IN SABLES IN RELATION TO THE TIME OF MATING, OESTROUS CYCLE TRAITS, AND AGE.** 52
M.D. Gel'bert.
Code 5-0.
- IS THERE A CRITICAL WEIGHT FOR OESTRUS IN THE FERRET.** 53
B.T. Donovan.
Code 5-12-0.
- EMBRYONIC DEVELOPMENT AND RESORPTION IN FERAL NUTRIA (MYOCASTOR COYPUS) FROM MARYLAND.** 53
J.A. Chapman, J.C. Lanning, G.R. Willner, D. Pursley.
Code 2-5-0.
- HISTAMINE AND SECONDARY AUTOIMMUNE INFERTILITY IN DARK MINK (MUSTELA VISON).** 54
B.R. Nemetallah, R.E. Howell, L.C. Ellis.
Code 5-8-M.
- ANALYSIS OF REPRODUCTIVE TRAITS OF DIFFERENT TYPES IN FEMALES.** 54
M. Bednarz.
Code 4-5-M-0.
- RESULTS OF INSEMINATIONS IN 1985.** 55
Maija Valtonen, Kaj Lindh.
Code 5-F.

Titles of other publications - not abstracted.

- Reproduction and infertility.** F.L.M. Dawson.
(Veterinary Annual, 26, 17-37, 1986). Code 5-0.
- Improvement of the reproduction function in fur animals and rabbits.** A.V. Vladimirov. (Biull. Vsesoiuznogo inst. eksp. veterinarii, Moskva Inst. 56, 68-70, 1984). (RUSS).
Code 5-M-F-0.
- Oestrus-associated anaemia in the ferret.** John E. Cooper, M.J. Brearley, A. Cunningham. (Vet. record, London British Vet. Ass., 117, 15, 395-396, 1985). Code 5-9-3-0.
- 'Non-breeders' in the red fox *Vulpes vulpes*: a case of resource surplus.** Torbjörn von Schantz. (OIKOS, 42, 59-65, 1984). Code 10-6-5-F.

6. NUTRITION AND FOOD TECHNOLOGY

- EFFECTS OF FEEDING MANIPULATIONS ON SERUM LEVELS OF THYROID HORMONES, TOTAL LIPIDS AND UREA IN GROWING FARMED RACCOON DOGS.** 56
 Hannu Korhonen.
 Code 6-3-0.
- DIGESTIBILITY OF NITROGEN AND AMINO ACIDS OF SOME DRY FEEDSTUFFS FOR MINK.** 61
 Tuomo Kiiskinen, Lea Huida, Barbara Pastuszewska, Hans Berg.
 Code 6-7-M.
- LOW-PROTEIN FEEDING IN MINK: EFFECTS ON PLASMA FREE AMINO ACIDS, CLINICAL BLOOD PARAMETERS, AND FUR QUALITY.** 61
 Jouko Työppönen, Maija Valtonen, Hans Berg.
 Code 6-3-M.
- TRIALS WITH CHANGES OF FEED AT DIFFERENT TIMES DURING PREGNANCY.** 62
 R. Sandø Lund.
 Code 6-5-M.
- RESTRICTED FEEDING AND USE OF INDUSTRIAL FISH.** 62
 Georg Hillemann.
 Code 6-7-M.
- EFFECTS OF FEEDING FREQUENCY AND INTENSITY ON GROWTH, BODY COMPOSITION, ORGAN SCALING AND FUR QUALITY OF FARMED RACCOON DOGS.** 63
 Hannu Korhonen, Mikko Harri.
 Code 6-2-0.
- THE NUTRITION OF FUR ANIMALS.** 64
 J. Mouka.
 Code 6-M-F-0.
- RECENT ADVANCES IN FEEDING FERRETS.** 64
 Boguslaw Barabasz.
 Code 6-0.
- FITCH DIETS IN NEW ZEALAND: AN ANALYTICAL SURVEY.** 65
 C.G. Rammell, H.V. Brooks, G.R. Bentley, G.P. Savage.
 Code 6-7-0.
- FORMULATION OF DIETS FOR YOUNG POLECATS.** 65
 G.S. Taranov, I.V. Babunova.
 Code 6-0.
- WATER INTAKE OF YOUNG MINK.** 65
 N. A. Balakirev, V.M. Sazanov.
 Code 7-6-M.
- DISTRIBUTION OF THIAMIN IN MINK.** 66
 V.A. Berestov, G.G. Petrova, S.P. Izotova.
 Code 6-3-M.
- TRIALS WITH DANISH POTATO PROTEIN FOR MINK.** 66
 Georg Hillemann.
 Code 7-M.
- VITAMIN TREATMENT OF PREGNANT BLUE FOXES DOES NOT PRODUCE MORE CUBS.** 67
 Vilhelm Weiss.
 Code 6-5-F.

- FEED VALUE OF EPRIN FOR MINK.** 67
D.N. Perel'dik.
Code 7-6-M.
- USE OF PELLETS CONTAINING DIFFERENT AMOUNTS OF GRASS MEAL FOR FEEDING OF NUTRIA, MYOCASTOR COYPUS.** 67
V.F. Kladovshchikov, L.S. Verevkina.
Code 7-6-0.
- TOXICITY OF 3, 4, 5, 3', 4', 5'-HEXACHLOROBIPHENYL TO MINK.** 68
R.J. Aulerich, S.J. Bursian, M.G. Evans, J.R. Hochstein, K.A. Koudele, B.A. Olson, A.C. Napolitano.
Code 8-M.
- LC50 TEST RESULTS IN POLYCHLORINATED BIPHENYL-FED MINK: AGE, SEASON, AND DIET COMPARISONS.** 69
T.C. Hornshaw, J. Safronoff, R.K. Ringer, R.J. Aulerich.
Code 8-M.

Titles of other publications - not abstracted.

Adaptation of exocrine pancreas secretion in mink to diet composition. C. Simoes-Nunes, Genevieve Charlet-Lery, D. Allain, R. Rougeot. (Reprod. Nutr. Develop, 25, 4B, 810. 1985). (FREN). Code 3-6-M.

Autumn feeding of breeding fur animals. Maija Valtonen. (Finsk Pälstidskrift, 17, 10, 511-512, 1983). (SWED). Code 6-M-F.

Polychlorinated biphenyls in a wild mink population. Thomas J. O'Shea, T. Earl Kaiser, Glen R. Askins, Joseph A. Chapman. (Worldwide Furbearer Conference Proceedings, 1746-1751, 198Ed. by J.A. Chapman & Duane Pursley). Code 8-10-M.

7. VETERINARY SCIENCE

- BLOOD SELENIUM DEPENDENT GLUTATHIONE PEROXIDASE ACTIVITY RELATED TO ENDOMETRITIS IN BLUE FOX (ALOPEX LAGOPUS).** 70
Mogens Jørgensen, Per Henriksen, Asbjørn Brandt.
Code 3-9-6-M.
- MASSIVE LIPID ACCUMULATION IN MINK LIVER STELLATE CELLS MAY BE CAUSED BY FUSARIUM MYCOTOXINS IN THE FEED.** 73
L.-A. Lindberg, Y. Gröhn, E. Karppanen.
Code 9-8-M.
- GLUCOSURIA ASSOCIATED WITH RENAL CALCULI IN ASIAN SMALL-CLAWED OTTERS.** 73
Paul P. Calle, Phillip T. Robinson.
Code 9-6-14-0.
- OBSERVATIONS ON AN OUTBREAK OF NUTRITIONAL STEATITIS (YELLOW FAT DISEASE) IN FITCH (MUSTELA PUTORIUS FURO).** 73
H.V. Brooks, C.G. Rammell, J.J.L. Hoogenboom, D.E.S. Taylor.
Code 9-6-14-0.

- INVESTIGATIONS ON RELEVANCE AND CLINICAL AND THERAPEUTICAL CHARACTERISTICS OF SURGICAL DISEASES IN THE NUTRIA.** 74
I. Ivascu.
Code 9-0.
- LATEX AGGLUTINATION TEST FOR DETECTING FELINE PANLEUKOPENIA VIRUS, CANINE PARVOVIRUS, AND PARVOVIRUSES OF FUR ANIMALS.** 75
Pirjo M.-L. Veijalainen, Erkki Neuvonen, Aimo Niskanen, Tapio Juokslahti.
Code 9-M-F-0.
- FUSARIUM MYCOTOXINS AS A PROBLEM IN FINNISH FEEDS AND CEREALS.** 75
Eeva Karppanen, Aldo Rizzo, Seija Berg, Erja Lindfors, Ritta Aho.
Code 8-M-F-0.
- DEMONSTRATION OF NON-DEGRADED ALEUTIAN DISEASE VIRUS (ADV) PROTEINS IN LUNG TISSUE FROM EXPERIMENTALLY INFECTED MINK KITS.** 76
S. Alexandersen, Å. Uttenthal-Jensen, B. Aasted.
Code 9-M.
- MONOCLONAL ANTIBODIES AGAINST ALEUTIAN DISEASE VIRUS DISTINGUISH VIRUS STRAINS AND DIFFERENTIATE SITES OF VIRUS REPLICATION FROM SITES OF VIRAL ANTIGEN SEQUESTRATION.** 76
Richard E. Race, Bruce Chesebro, Marshall E. Bloom, Bent Aasted, James Wolfenbarger.
Code 9-M.
- A CASE OF MINK TUBERCULOSIS CAUSED BY MYCOBACTERIUM BOVIS.** 77
Ömer Akay, Nejat Aydm, Mustafa Anda, Rifki Hazioglu.
Code 9-M.
- TYZZER'S DISEASE AS A COMPLICATION OF CANINE DISTEMPER IN A RACCOON.** 77
Zbigniew W. Wojcinski, Ian K. Barker.
Code 9-0.
- TOXASCAROSIS IN THE BREEDS OF THE BLUE FOX (ALOPEX LAGOPUS).** 77
M. Stanek.
Code 9-F.

Titles of other publications - not abstracted.

- The nutria (*Myocastor coypus*) and its diseases.**
Jukka Arstila. (Suomen Eläinlääkäri-lehti, 92, 3, 124-128, 1986). (FINN). Code 9-0.
- Occurrence and Importance of Bacterial Infectious Diseases in Nutria (*Myocastor coypus*) - Post-Mortem Findings at Potsdam Regional Institute of Veterinary Medicine.**
B. Wendland. (Mh.Vet.-Med., 41, 102-103, 1986). (GERM).
Code 9-0.
- Vaccination of furbearing animals.** Mogens Hansen.
(Dansk Vet.Tidskr., 69, 4, 15/2, 1986). (DANH). Code 9-M-F-0.

Angiopathic retinal degeneration in a fennec fox. Herbert E. Whiteley, Amy L. Shima, John P. Sundberg. (JAVMA, 187, 11, 1266-1267, 1985). Code 9-F.

Osteoma in a ferret. Wayne A. Jensen, Ronald K. Myers, Chen-Hsuan Liu. (JAVMA, 187, 12, 1375-1376, 1985). Code 9-0.

Raccoon Ascarids Pose Public Health Treat. J.H. Greve. (Iowa State Univ. Veterinarian, 47, 1, 13-14, 1985). Code 9-0.

How to improve the control of Aleutian disease of mink. V.S. Slugin, Yu P. Voznyuk, V.B. Reznikov, S.I. Ivat, K.P. Bobryshev. (Veterinariya, Moscow, USSR, 3, 31-33, 1986). (RUSS). Code 9-M.

ADV-Monomer-RF-DNA: Characterization and its Use as Hybridization Probes in the Study of Aleutian Disease of Mink. M. Köchelt, K. Willwand, L. Haas, O.-R. Kaaden. (Zb. Bakteriologie Mikrobiol. und Hugiene, A, 260, 489, 1985). Abstract. Code 9-M.

Detection of Neutralizing Antibodies in ADV-Infected Mink. B. Stolze, M. Löchelt, O.-R. Kaaden. (Zb. Bakteriologie Mikrobiologie und Hygiene, A, 160, 4, 512, 1985). Abstract. Code 9-M.

Microfilariae of Tetrapetalonema llewellyni in Raccoons of Cades Cove, Great Smoky Mountains National Park, Tennessee, USA. Alan R. Rabinowitz, Sharon Patton, Vicki Major. (J.Wildlife Diseases, 21, 4, 449-450, 1985). Code 9-0.

Sylvatic trichinosis in Ontario, Canada. T.A. Dick, B. Kingscote, M.A. Strickland, C.W. Douglas. (J.Wildlife Diseases, 22, 1, 42-47, 1986). Code 9-M-F-0.

Intradermal Infestation of a Red Fox (*Vulpes vulpes*) by the Lone Star Tick (*Amblyomma americanum*). Donald D. Smith, Jacob K. Frenkel. J. Wildlife Diseases, 22, 1, 122-124, 1986). Code 9-F.

Distribution of *Toxoplasma gondii* in foxes in central Italy. G.A. Polidori, M. Chiovoloni. (Atti della Societa Italiana delle Scienze Veterinarie, 38, 764-766, 1984) (ITAL). Code 9-F.

***Strongyloides planiceps* (Nematoda; Strongyloididae) in Some Wild Carnivores.** Tohru Fukase, Shiro Chinone, Hiroshi Itagaki. (Jpn.J.Vet., Sci., 47, 4, 627-632, 1985). Code 9-M-F-0.

***Brugia Malayi*: Immunobiology of microfilarial clearance and the lesion of occult filariasis in ferrets.** James P. Thompson. (Dissertation Abstracts Internat., B, 45, 7, 2097, 1985). Code 9-0.

Dirofilariasis in a ferret. A.F. Moreland, A.H. Battles, J.H. Nease. (JAVMA, 188, 8, 864, 1986). Code 9-0.

Concurrent distemper and disseminated toxoplasmosis in a red fox. Willie M. Reed, John J. Turek. (JAVMA, 187, 11, 1264-1265, 1985). Code 9-F.

The relationship of *Baylisascaris procyonis* to Illinois raccoons (*Procyon lotor*). Daniel E. Snyder, Paul R. Fitzgerald. (J. Parasit, 71, 5, 596-598, 1985). Code 9-0.

Coccidiosis in coypus. K.K. Nukerbaeva, M.D. Umurzakov. (Veterinariya, Moscow, USSR, 9, 42-43, 1985). (RUSS). Code 9-0.

Dental and Cranial Anomalies in the River Otter (Carnivora: Mustelidae). Thomas D. Beaver, George A. Feldhamer, Joseph A. Chapman. (Brimleyana, 7, 101-109, 1981). Code 2-0.

In vitro studies with the scrapie agent. Yu. D. Cherednichenko, G.R. Mikhailova, J. Rajcani, V.M. Zhdanov. (Acta Virologica, Czechoslovak Acad. of Sci., 29, 4, 285-293, 1985). Code 9-M-0.

8. List of addresses.

78



*You can already now
preorder this new
book on Fur Animals*

»BEAUTIES OF FARMED FUR ANIMALS - and their colour genetics«, is produced and published by SCIENTIFUR. To plan the production, it is necessary to get an estimate of the number of persons who want to buy the book and the language preferred.

The book will be printed in Norwegian, Finnish and English. Editions in other languages will be performed if at least 2000 preorders per language are available.

NB: Do not send money now!!!

For orders to be delivered on one address, the following quantity discounts are given:

Quantity	Discount	Quantity	Discount
10 - 99	5%	250 - 499	20%
100 - 249	10%	500 or over	25%

YES I the undersigned order hereby the ENGLISH version of the book: »BEAUTIES OF FARMED FUR ANIMALS - and their colour genetics«, to be delivered as soon as possible, at a price of Dkr. 260,- + postage.

Number of books: _____

Payment in foreign currency will be accepted, but invoiced to actual exchange ratio to Danish crowns (Dkr.) + *exchange costs*.

I the undersigned want to pay in the following currency (Mark with x):

Dkr. _____ US\$ _____ Can. \$ _____ GBP £: _____
DM: _____ Other: _____

At present (January 1987) the exchange ratio is: 100 Dkr. = 15 US\$, 20 Can. \$, 10 GBP \$ or 27 DM.

Name: _____

Address: _____

Country: _____ Zip code: _____ City: _____

(Please use type writer or block letters)





NOTES

SCIENTIFUR, VOL. 11, No. 1, 1987.

PLEASE, READ THIS NOTES !!

We know very well that all readers of SCIENTIFUR are very busy with their research - educational - or advisory work as well as by the very important work in the boards of the breeders associations or as the leaders of organizations or supplying companies. Therefore, we also realize that you very often have to "skim the soup" and perhaps only look for things of especially relevance for you.

Perhaps just therefore it is very seldom we receive comments to the problems discussed in the NOTES. Of course, at lot of the statements are information about our joy or our worries in relation to the daily management of SCIENTIFUR. But very often we are also dealing with problems of the future of SCIENTIFUR and discussing about how SCIENTIFUR at the same time can be a more effective help for everybody in the fur animal production.

A very good piece of news are the fact that the book "Mink Production" is going to be translated into Spanish and distributed thanks to support from ESSEX (ESPANA) S.A., a division of the Schering Corporation, USA.

We think it is very positive that ESSEX (ESPANA) S.A. during this is supporting the fur animal production in Spain. Therefore, we wish to congratulate the fur breeders in Spain with this and thanks Mr. José Luis Casado for the initiative, and by this support gives "a pat on the shoulder" both to SCIENTIFUR and the authors of the book.

During the latest 2 volumes of SCIENTIFUR (Nos 9 and 10) all readers, hopefully, have observed the announcement from AMERICAN SCIENTIFIC LABORATORIES, also a division of Schering Corporation, USA.

We in SCIENTIFUR are very grateful for that support - thank you for it. We also thank you for the order for announcement in SCIENTIFUR Vol. 11 and the SCIENTIFUR INDEX, which - at least - will appear during this spring.

During the middle of 1987 the book "Mink Production" will be published in a Japanese translation. Thanks to the Japanese International Fur Trade Co., Ltd., by its president Mr. Fumio Muray, is has been possible for us to underline the good relations to the Japanese fur breeders and other people in the fur industry, for whom the Japanese translation will give the possibilities of making profit of the Scandinavian know how in the field of mink production.

For completing this series of thanksgiving we also want to thank The Milk Specialties Co., Fur Food Division, which, during its president, Mr. John J. Brennan, has supported SCIENTIFUR with distribution of "Mink Production" in USA. An last but not least, The Fur Breeders Organizations in the Scandinavian Countries, whose support during their subscription to 160 copies of SCIENTIFUR make the economical basis for this service. Also colleagues editing the various local journals regarding fur animals we want to thanks for their support during kind mentioning of SCIENTIFUR and other products from us.

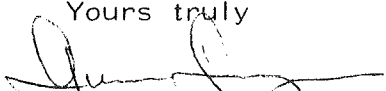
WE DO HOPE THAT THIS SUPPORTS WILL BE AS POSITIVE FOR THE ORGANIZATIONS OR THE COMPANIES AS FOR SCIENTIFUR!

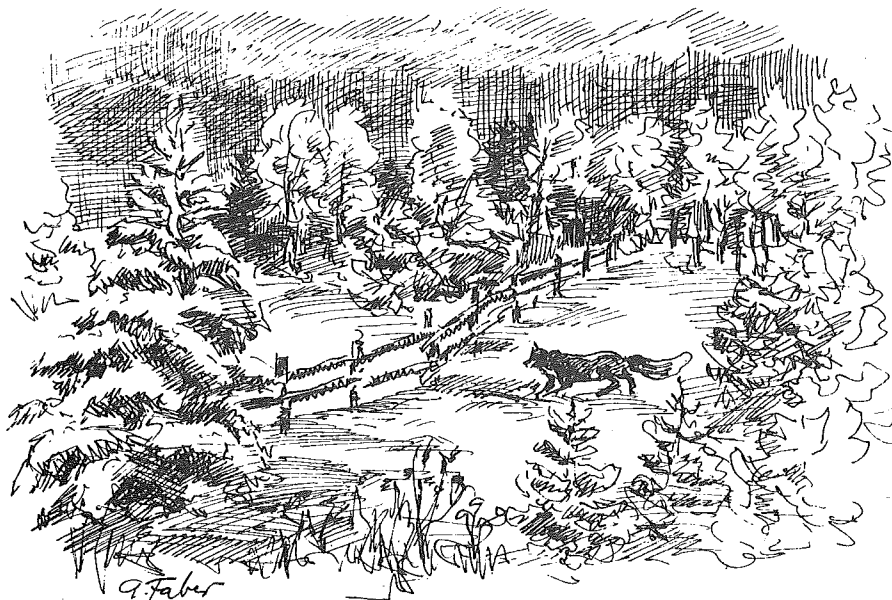
WE ALSO HOPE THAT OTHER ORGANIZATIONS AND COMPANIES DURING THEIR USE OF SCIENTIFUR AND RELATED ACTIVITIES OF INFORMATION AND/OR ADVERTISEMENTS WILL SUPPORT SCIENTIFUR FOR ACCELERATING THE DEVELOPMENT AND BY THIS SECURE ITS FUTURE.

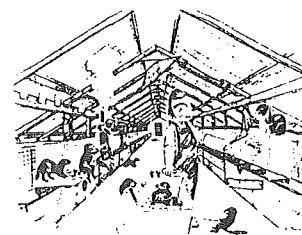
All the readers of SCIENTIFUR and many others will soon receive the folder regarding the unique book: "Beauties of Farmed Fur Animals - and their colour genetics". We hope that all of you will find this offer attractive and order the book(s). Due to the fact that we as a non profit organization do not have the budget necessary for real marketing of the book, please, mention the book to everybody you think may be interested. Also in the educational area we think the book will be useful, because of its interesting learning about and demonstration of the facinating heridity of colours.

This was a lot of words. Thank you for reading them. We hope that you in the future also will give the Notes YOUR ATTENTION because several very important things have to be solved for us during the next 1 1/2 years. It will be a part of the discussion in coming issues of SCIENTIFUR.

Yours truly


Gunnar Jørgensen
The Editor





BIOAVAILABILITY, PROPHYLACTIC AND THERAPEUTIC VALUE OF ERYTROWET.

Dostępność biologiczna i wartość terapeutyczno-
-profilaktyczna preparatu Erytrowet

Stanislaw Woloszyn, Zbigniew Gradzki, Stanislaw Winiarczyk.

The aim of the studies was to establish a biological availability of Erytrowet-Polfa after oral application and its value in therapy of some infectious diseases of domestic animals. The concentration of the antibiotic in blood sera was determined by a diffusion-plate method using *Sarcina lutea* as a reference strain. It was found that after oral application of Erytrowet at a dose equivalent to 50 and 100 mg of erythromycin per kg of body weight the antibiotic is absorbed from the alimentary tract of polecat-ferrets, dogs, pigs and young calves and it reaches the maximal level from 2.3 to 6.1 mcg/ml after 1 h since the application. After 3 h since the treatment the level of antibiotic steadily decreased and persisted in polecat ferrets and dogs for 12 h. In adult goats and sheep the antibiotic was resorbed more slowly and it reached maximal level 3.0 and 4.1 mcg/ml after 6 h, respectively. After 24 h the presence of the antibiotic in blood was calves 0.2 mcg/ml, pigs 0.1 mcg/ml, goats and sheep 0.2-0.5 mcg/ml. The therapeutic efficiency of Erytrowet in the treatment of staphylococcosis in polecat-ferrets and foxes was equal to Tylavit-sulpha. The MIC values of erythromycin for the isolated strains of *S. aureus* ranged from 0.1 to 0.75 mcg/ml. Erytrowet appeared also to be useful in the treatment and metaphylaxy of ovine listeriosis because it eradicated the disease. The MIC value of erythromycin for *L. monocytogenes* ranged from 0.04 to 0.1 mcg/ml.

Medycyna Weterynaryjna (Poland), 41, 5, 259-263, 1985.

3 tables, 10 references.

In POLH. Summary: ENGL, RUSS.

Authors summary.

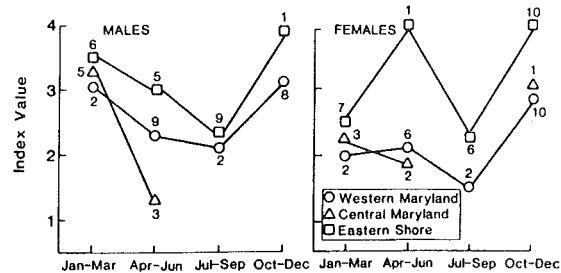
MORPHOLOGICAL AND PHYSIOLOGICAL CHARACTERISTICS OF MUSKRATS FROM THREE DIFFERENT PHYSIOGRAPHIC REGIONS OF MARYLAND, USA.

Elizabeth E. Zucker, J.A. Chapman.

Between 1977 and 1979, 210 muskrats (*Ondatra zibethicus*) were trapped from 3 different physiographic regions of Maryland: Allegheny Plateau, Piedmont Plateau, and coastal plain. Two subspecies are found in Maryland, *O.z. zibethicus* (Western Maryland) and *O.z. macrodon* (Eastern Shore). The muskrats of Central Maryland are considered to be an intergrade, but data from this study show that they closely resemble the Western Maryland subspecies. Seasonal and subspecific changes in metabolic and physiological indices are discussed. Testicular weights and lengths of adult muskrats peaked in May. Sperm was found in the testes and epididymides of at least some portion of the male population every month of the year except October. During the breeding season, adult males began producing sperm several months before subadult males. Ovulatory activity was first observed near the end of March. Breeding activity ceased by October in Eastern Shore females, with Western Maryland females probably becoming reproductively inactive several weeks before eastern shore animals. Based on embryo and corpora lutea counts, Western Maryland

litters average 6.0 young, while eastern shore litter average 4.8 young. An average placental scar count of 13.6 was observed for Western Maryland females while central Maryland females average 11.6.

Fig. 3. Mean seasonal body fat indices for adult muskrats from three physiographic regions of Maryland. Numbers are sample sizes



Z. Säugetierkunde, 49, 2, 90-104, 1984.
6 tables, 6 figs., 43 references.

Authors' summary.

AGE DETERMINATION AND MORPHOLOGICAL CHARACTERISTICS OF WILD MINK FROM MARYLAND, USA.

G.R. Askins, J.A. Chapman.

A total of 169 wild mink were collected during the 1976-1979 trapping seasons in Maryland. Three aging techniques were applied: 1. aging by cementum annuli, 2. the presence or absence of the zygomatic suture, and 3. size of the suprascapular tubercle. The age distribution was 111 juveniles to 58 adults and the sex ratio was 108 males to 61 females (177 males/100 females). Significant correlations were found for testes weight, epididymides weight, spleen weight, nasal length and nasal width with age for male mink. Significant correlations were found for spleen weight, kidney weight, liver weight, nasal length and nasal width with age for female mink. Spermatogenic activity began in mid-December and continued through February.

Z. Säugetierkunde, 49, 3, 182-189, 1984.
3 figs., 6 tables, 19 references.

Authors' abstract.

AGE DETERMINATION, REPRODUCTION, AND MORTALITY OF THE GRAY FOX (UROCYON CINEREOARGENTEUS) IN MARYLAND, U.S.A.

R.A. Wigal, J.A. Chapman.

Four techniques for determining age were investigated for 143 gray foxes (*Urocyon cinereoargenteus*) collected in Maryland, 1976-1979: 1. counts of cementum layers in the teeth, 2. epiphyseal closure of the humerus, 3. eye lens weights and 4. baculum length and weight. Age distribution analyses indicated a balanced age structure. The juvenile segment of the population exceeded 50% in each of the three seasons studied. The overall sex ratio for Maryland gray foxes was 123.4 males per 100 females. Mean testis weights and spermatogenic activity suggested that adult male gray foxes become fertile sooner than juveniles entering their first mating season. The onset of estrus in female gray foxes from Maryland appeared to occur in early February. Mean litter size, estimated from placental scar counts, was 4.42 (range 3-5) pups per year. The prenatal mortality rate was estimated to be 39% and the implantation rate of ova was 88%.

The proportion of barren females was 45%.

Z. Säugtierkunde, 48, 4, 226-245, 1983.

9 tables, 8 figs., 38 references.

Authors' abstract.

THE STATUS, POPULATION CHARACTERISTICS AND HARVEST OF THE RIVER OTTER IN MARYLAND.

Elmer E. Mowbray, Duane Pursley, Joseph A. Chapman.

1. The River otter (*Lutra canadensis*) population in Maryland was studied between 1974 and 1977. Additional data on harvest were collected through 1978.

2. The primary harvest areas for river otter were the counties surrounding Chesapeake Bay. A few otter were trapped along the Potomac River. The annual harvest fluctuated from year to year. Extensive water areas were the principal component of otter habitat.

3. The sex ratio of trapped river otter in Maryland favored males.

4. Based on variable sizes of fetuses collected on the same dates, Maryland otter did not appear to synchronize parturition dates. However, it is believed that parturition occurs between March 10 and May 20 in Maryland.

5. The ovaries of pregnant female river otter in Maryland contained a mean of 2.74 \pm 0.77 active corpora lutea. Of 15 litters examined, four (26 percent) showed evidence of ova crossing to the opposite uterine horn.

6. The mean litter size for Maryland otter was 2.73 \pm 0.77. Based on 44 corpora lutea from 15 otter whose uteri contained 40 implanted embryos, 9 percent (4) of the ova either failed to implant or were resorbed before becoming visible as embryos.

7. The population status of Maryland otter was estimated using the structural model developed by Henny et al. (1970). An annual population increase of 2.7 percent indicated that the Maryland otter population is essentially stable; and that as long as the habitat is suitable, the Maryland otter population will remain at present levels.

Maryland Wildlife Administration,

Publication in Wildlife Ecology, no.2, December 1979.

7 tables, 6 figs.,

Authors' summary.



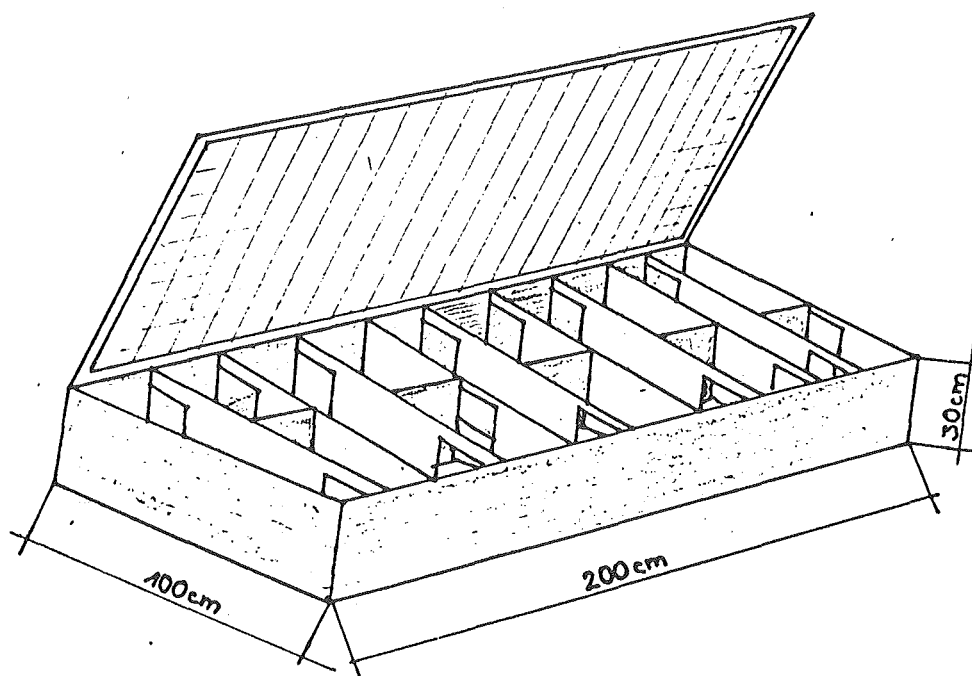
Figure 5. River otter in typical marshland habitat (photo by Leonard Lee Rue).

MOVING ACTIVITY OF FERRET IN A T-TYPE LABYRINTH.

(Testovanie pohybovej aktivity fretky tchorovitej v bludisku typu T)

J. Rafay, V. Parkányi, M. Barta, I. Jakubicka.

Adult and young ferrets aged 70, 77, 84, 91, 98, 105 and 112 days respectively were tested in a five-sector labyrinth with T-shaped passes. The time of the animals passage through the labyrinth was recorded. The animals were divided into groups so that the influence of age, sex, time of the day and litter size on the passing time could be studied. The results show that this method could provide objective criteria for selection of animals for a further breeding. It has been confirmed by a positive regression between the moving activity of the parents and that of the young animals.



Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. pp 169-183.

9 figs.

Authors' summary.

In CZEC. Summary ENGL.

INCIDENCE OF DEVELOPMENTAL DISORDERS IN NUTRIA.

(Vyskyt vyvojovych poruch pri nutriach).

W. Scheuring.

The paper shows 14 cases of developmental disorders in nutria, that appear both in Polish and foreign breeds. The following disorders are shown: acephalia, oligodonthis, polyodonthis, rententio dentis, agnathia, brachygnathia superior, kamphylognathia, otocephalia, chelioschisis, polypodia,

polypodia cum polydactylia, polydactylia, perodactylia and abbreviatio caudae.

Proceeding from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, pp. 191-197.

1 table, 5 references.

Authors's summary.

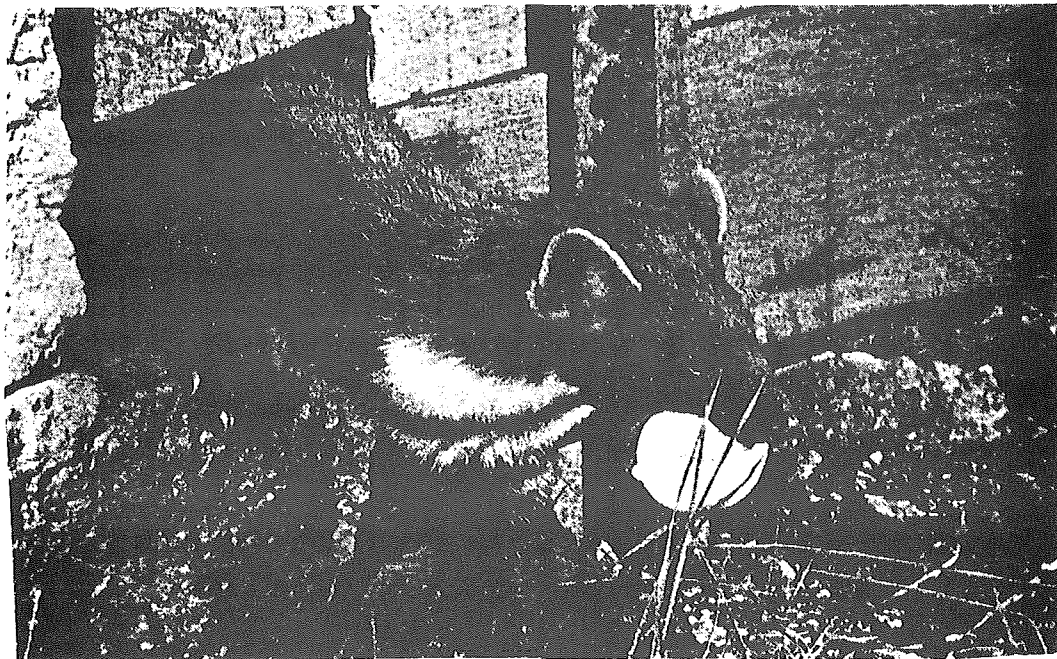
In CZEC. Summary ENGL.

SOME OBSERVATIONS ON MARTEN.

(Noen observasjoner av mår).

Erling Kvalheim.

This is an amateur's report of observations made on 6 wild Pine martens, *Martes martes*, near a lumber hut. Two of the animals became so tame as to accept food offered from the hand. Figs, margarine and bread were used as bait. Each animal was recognized by the individual pattern of the light breast patches. A way of making out the sex of the animals and measuring their lengths is given. The animals were able to smell out rotten hen eggs, but not fresh eggs. They always carried the eggs in their mouth. Some observations may imply that the female marten exhibits a stronger instinct for hoarding food (eggs) than the male. A 2 1/2 year old female marten is reported to have a fear of squirrels. The reason for her supposed repressed development is discussed. This female marten and her sister were often seen with each other until they were about 2 years old. Sounds similar to cat wailing are reported and in mid winter some of them might be a prelude to mating. Discovery of a marten's nest with two cubs is reported. A theory that the mother might only have been one year old is advanced.



Fauna, 27, 4, 196-210, 1974.

8 photos, 12 references.

In NORG. Summary ENGL.

Author's summary.

THE PRODUCTION CHARACTERISTICS OF FITCH (*MUSTELA PUTORIUS*).

K.H. Giles.

The potentially high levels of productivity of fitch - 2 litters per year, 8 young per litter - is rarely achieved in practice. Annual litter rates vary from 0.9 to 1.7 per female kept, due to high rates of false pregnancy (up to 90%). Kit mortality can reach high levels (to 50%). Young fitch grow rapidly and reach mature body size at 20 weeks (males 1400 g; females 800 g). Subsequent fluctuations in body weight are attributable to adipose depositions.

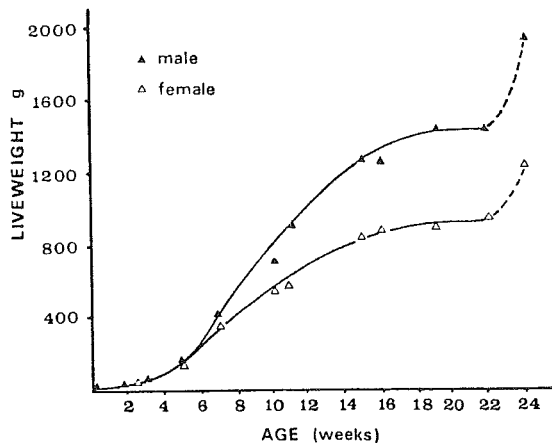


FIG. 1 Growth of kits to 24 weeks.

Proceedings of the New Zealand Society of Animal Production, 44, 61-62, 1984
5 tables, 1 fig., 4 references. Author's abstract.

LABORATORY METHODS FOR EVALUATION OF THE PHYSIOLOGICAL STATE OF FUR ANIMALS.

(Laboratorne metódy hodnotenia fyziologického stavu kozusinových zvierat).

V.A. Berestov.

A large study of determination of morphological, biochemical and immunological determinants in blood was carried out at the Karelian Branch of the Academy of Sciences of USSR. It enabled to work out a system of control of the physiological state of the animals and to suggest its practical use in the fur animals breeding. It includes enzyme-immunological tests, determination of haemopoiesis and thiamindiphosphate effect in evaluation of live animals for content of thiamine, determination of vitamine concentrations in liver.

Proceeding from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, pp 65-68.

In CZEC. Summary ENGL.

Author's summary.



INFLUENCE OF DIFFERENT CONDITIONS OF HOUSING ON INCIDENCE OF SOME MOST FREQUENT DAMAGES IN NUTRIA FUR.

(Vplyv roznych podmienok ustajnenia na vyskyt niekterych najcastejsich vad osrtenia nutrii).

I. Tocka.

The results of quality evaluation of the hair in view of the most frequent damages - felting and abrasion - which depend directly on the quality of housing, the following conclusions can be drawn. The hall housing of nutrias on the litter can lead to a higher frequency of felting compared to open housing. It applies specially in older animals. In case of a higher incidence, the felting should be attenuated by combing the hair, the litter should be changed regularly and the animals should be kept in clean environment. On the other hand, compared with open housing, we found a lower incidence of hair abrasion in the halls.

From this point of view, the hall housing of nutrias on the litter can be considered as a prospective way of housing with a possibility of producing high quality furs.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept., 1986. 207-211.

1 table.

Author's summary.

In CZEC. Summary ENGL.

EXPERIENCES OF EFFECTS OF INDUSTRIAL SYSTEMS OF NUTRIA BREEDING ON THEIR PERFORMANCE UNDER CONDITIONS OF FARM BREEDING.

(Poznatky v oblasti vplyvu priemyselnych technologickych systemov chovu nutrii na ich uzitkovost v podmienkach velkochovu).

J. Kuzma, J. Brotan.

We studied the influence of the industrial system of breeding of nutrias on their performance under conditions of intensive farm breeding during 36 months of their housing. The comparison of the results shows that there is a continuous decrease of the performance in all parameters which has a peak during the third year of the housing when the animals of the basic herd are bred by use of the cages technology in a nontraditional dry was in harems (1 + 5) with continual breeding. The number of life-born nutrias decreases in average by up to 2.05 per female of the basic herd; at the same time, there is an increased mortality of the females by 0.94 and also increased culling by 1.82 animals per cage-harem compared to the first year of operation in spite of an adherence to all zoohygienical principles in breeding. During the period shown, there is a complete exchange of the animals of the basic herd for new ones which do not, however, attain the level of performance parameters of the animals originally housed. Although a temporary improvement appears the decrease of performance at continuous operation goes on.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept., 1986, 199-206.

1 table.

Authors' summary.

In CZEC. Summary ENGL.

THE ESTIMATE OF TECHNICAL EQUIPMENT OF FOX FARMS IN POLAND

(Technike vybavenie fariem mäsozravych kozusinovych zvierat v polsku).

A. Frindt.

In Poland, the equipment of farms with machines and installations is very differentiated. The owners of the farms have difficulties in purchase of the machines and installations, because Poland has not factories producing the equipment for the farms.

In this experiment was estimated technical equipment of farms with the aid of the coefficient W_{wt} . Value of coefficient varied from 0 to 1,0. In this experiment eight farms were investigated: state, cooperative and private. In these farms the coefficient W_{wt} varied from 0.40 to 0.79.

Proceeding from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept., 1986. 53-59.

3 tables.

Author's summary.

In CZECH. Summary ENGL.

A STUDY OF THE DUODENAL GLANDS OF THE MINK.

ミンクの十二指腸腺に関する研究

Kazushige Takehana, Mitsuo Abe.

The site, distribution, cell formation and glycoproteins of the duodenal glands of the mink by means of light-and electron-microscopic methods were observed.

The results are summarized as follows:

1. The duodenal glands were located from the pyloric region to about 0.5 cm in a caudal direction and were in constant distribution.
2. The acinous cells of the duodenal glands of the mink consisted of mucous cells. The acinous cells contained neutral and acidic glycoproteins.
3. By Po-lectin-DAB reactions, neutral glycoproteins contained α -D-glucose, α -D-mannose, α -fucose, N-acetyl- α -D-galactosamine, N-acetyl-D-glucosamine, galactose and D-galactose, and acidic ones contained sialic acid.

Journ. College of Dairying, 11, 1, 179-186, 1985.

16 references, 14 figs.

Authors' summary.

In JAPAN. Summary ENGL.

QUANTITATIVE AND QUALITATIVE HISTOLOGICAL STUDY ON STANDARD NUTRIA AGED 5 AND 8 MONTHS.

(Studiul histologic calitativ si cantitativ al pielii de nutrie standard, la virsta de 5 si 8 luni).

M. Miclea, Cornelia Duca, Z. Papay.

The structural characteristics of standard nutria were studied on biopsies performed on two age categories. There were revealed some structural differences of the skin; the qualitative study showed that the number of follicles on a follicular patch increases at the age of 8 months (53.95 threads) as measured against 42.16 at 5 months. Nevertheless, their number per cm² of skin decreases, due to the growth in width of the skin.

The ear-follicle diameter increases by 15.04 μ as well as the number of fluff by 2.51 related to one ear; but the total diameter of fluff follicles decreases (34.96 μ), due to their growth on a follicular patch.

The indices obtained proves that the growing mature of the fur is completed by the age of 8 months, when it is possible to obtain pelt of good quality.

Bul. Inst. Agron. Cluj-Napoca, Zootehn.si Medicina Vet., 39, 39-42, 1985.
2 figs., 1 table, 4 references. Author's summary.
In ROMN. Summary ENGL.

HISTOLOGICAL STRUCTURE OF THE HAIR FROM THE POINT OF VIEW OF THE FUR QUALITY.

(Histologicka stavba srsti z pohledu kvality kozesin).

A. Galatik.

There is an important relation between the microscopic histological features of the hair coat and the useful properties of the fur skin. The durability, beauty, density and other values of the natural fur depend mainly on the animal species with its special mutations and the architecture of the hair shaft. The second relation belongs to the actual phase of the hair growth cycle.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 59-64.
In CZEC. Summary ENGL. Author's summary.

MORPHOFUNCTIONAL ADAPTATIONS OF SABLE SKELETON UNDER CONDITIONS OF INDUSTRIAL BREEDING.

N.A. Slesarenko.

Sables raised in cages, in contrast to wild sables, undergo adaptational reconstruction of the shape, contours, and internal architectonics of the bones. The noticeable adaptations in the skeleton, associated with confinement of the animals to limited areas, indicate disturbance of metabolism and growth processes in the bones, which must be considered in disease protection among sables being raised for commercial purposes.

Translated from: Vsesoiuznaia akademiia sel'skokhoziaistvennykh nauk, Doklady, 37-38, 20 AK1).
UDC 636.934.55:611.71. 1984 by Allerton Press, Inc.
10 references. Author's abstract.
In ENGL.

THE LIPID COMPOSITION OF LYSOSOMES IN THE LIVER OF ARCTIC FOXES.

ЛИПИДНЫЙ СОСТАВ ЛИЗОСОМ ПЕЧЕНИ ПЕСЦОВ

E.I. Lizenko, O.M. Bolgova, S.I. Gur'yanova.

The lysosomal fraction was isolated by differential centrifugation from the livers of arctic fox cubs infected experimentally with unspecified intestinal nematodes, and of uninfected controls. The activity of acid phosphatase and the lipid and fatty acid compositions of the lysosomal fraction were determined by thin-layer chromatography and spectrophotometry. There

were no qualitative differences in the lipid or fatty acid composition between infected and uninfected foxes. There was a tendency to increases in the activity of acid phosphatase and to decreases in amounts of the lecithin and cephalin fractions of phospholipids and polyene fatty acids in infected animals. Significant differences were noted only for lysolecithins, the amounts of which were higher in infected animals. It is suggested that these changes are caused by the activation of phospholipase A in the liver lysosomes of infected animals.

Petrozavodsk, USSR, Karel'skii Filial Akademii Nauk SSR, 27-38, 1980.
3 tables, 16 references CAB-abstract.
In RUSS.

FUNCTIONAL ANALYSIS OF THE RELATIVE LENGTH OF SPINE SECTIONS OF MUSTELIDS MAMMALIA MUSTELIDAE.

К ФУНКЦИОНАЛЬНОМУ АНАЛИЗУ ОТНОСИТЕЛЬНОЙ ДЛИНЫ
ОТДЕЛОВ ПОЗВОНОЧНИКА НЕКОТОРЫХ КУНЬИХ
(MAMMALIA, MUSTELIDAE)

O. Ya Pilipchuk.

The absolute lengths of curvical thoracic, lumbar and sacral spines were measured and their relative lengths (in % to the total length) were calculated for certain mustelids, (51 skeletons of 13 spp. (*Martes martes*, *M. foina*, *M. zibellina*, *Mustela nivalis*, *M. erminea*, *Kolonocus sibiricus*, *Putorius evermanni*, *P. putorius*, *Lutreola lutreola*, *Vormela peregusna*, *Meles meles*, *Lutra lutra* and *Enhydra lytris*) were examined). The bio-mechanic peculiarities of the locomotor apparatus in the animals were discussed.

Vestn. Zool., 0, 4, 1979, 46-50.
1 table, 17 references.
In RUSS. Summary ENGL.

Biosis Abstract.

VERTEBRA LENGTH CHANGES IN MOMENTS OF RESISTANCE OF VERTEBRAL BODIES IN PREDATORY MAMMALS.

ИЗМЕНЕНИЯ МОМЕНТОВ СОПРОТИВЛЕНИЯ
ТЕЛ ПОЗВОНКОВ ПО ДЛИНЕ ПОЗВОНОЧНИКА
У ХИЩНЫХ МЛЕКОПИТАЮЩИХ

O. Ya Pilipchuk.

The skeleton of the vertebral column was studied in representatives of 4 families of predators: *Canis lupus* L., *C. dingo* Blumend., *C. aureus* L., *C. familiaris* L., *Nyctereutes procyonoides* G., *Alopex lagopus* L., *Felis lynx* L., *F. concolor* L., *F. uncia* L., *Acinonyx jubatus* Schrab., *F. chaus* L., *Mustela erminea* L., *Martes zibellina* L., *M. martes* L., *M. foina* L., *Urus arctos* L. and *U. thibetans* L. Data made it possible to evaluate the motor and supportive functions of various sections of the spine, the character for stress distribution and showed the most vulnerable places of the spinal column.

Vestn. Zool., 0, 1, 43-47, 1980.
1 fig., 7 references.
In RUSS

Biosis Abstract.

RESPONSIBILITIES OF VETERINARY SERVICES FOR GOOD FUR ANIMAL HEALTH.

(Die Aufgaben des Veterinärwesens bei der Gesunderhaltung der pelztiere).

U.D. Wenzel, J. Hartung.

Mink and beaver breeding has become a highly specialised and effective branch in socialist agriculture and forestry of the GDR, an achievement substantially owed to the veterinary services in charge of fur animals. Veterinary specialist centres were established to take care of good health conditions on mink farms and beaver breeding centres. Mink health care is based on annual working programmes, with emphasis being laid on plasmacytosis-free mink stock. Loss due to virus enteritis of mink, distemper, Aujeszky's disease, and salmonella infection has been reduced by organised prophylaxis, after-care, and early therapy. The importance to mink of nutritional damage and metabolic disorders was found to be even greater than that of infectious diseases. Their containment is one of the most substantive prophylactic preoccupations of the fur animal health services. Those in charge of beaver care are primarily preoccupied with improvement of hygiene conditions in beaver breeding areas. Attention is focussed, in that context, on prevention of parasitoses and of bacterial diseases in connection with water management. Dry keeping is preferred, with advantage being taken of elevated wire enclosures and solid buildings. Advice to practitioners as well as training and upgrading of attendants are other responsibilities of the fur animal health services.

Mh. Vet.-Med., 41, 627-629, 1986.

1 table, 1 reference.

Authors' abstract.

In GERM. Summary ENGL, RUSS.

A COMPARISON OF PELT PRODUCTION IN THE NORDIC COUNTRIES.

(Jämförelse av skinnproduktionen i de nordiska länderna).

Kristian Fjeldin.

The production of Scan Black and Pastel mink and blue fox pelts in Denmark, Finland, Norway and Sweden from 1971-72 to 1983-84 is compared, with data being presented in 10 graphs. Economic aspects are considered.

Finsk Pälstidskrift, 20, 3, 160-167, 1986.

1 table, 10 figs.

CAB-abstract.

In SWED.

DOMESTIC SOURCES OF FURS.

(Tuzemské zoroje kozesin).

R. Janda.

One of the important tasks of the breeding of fur animals is a further aim-oriented development of all domestic raw material sources and an intensive exploitation thereof by processing enterprises. The processing industry must orient its attention towards and increased quality, fashionable products, spreading of production of extra quality products and a systematic innovation. Similarly, the breeders should focus on higher effectivity of animal production, feed conversion, optimization of the number of animals, higher performance and optimal parameters at the time of skinning.

The Czechoslovak processing industry will have to get oriented towards domestic sources of furs which would give the breeders a desired certainty.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia. 4.-5. Sept. 1986. 19-24.

In CZEC. Summary ENGL.

Author's summary.

THE EVALUATION OF FUR ANIMAL ECONOMY IN SLOVAK FARMS.

(Zhodnotenie ekonomiky Slovenskych chovov mäsozravých kozusinových zvierat).

D. Sekerka.

The paper includes three selected economical categories that were monitored in all breeding spots of carnivorous fur animals in Slovakia in 1980-1984. The development of the unit costs was, in general, positive. There was a shift in the structure of the costs, namely, a decrease in labour costs and an increase of material costs; the overhead costs increased by only 2%. The productivity of work represents an average within the industry. Its increase, however, can not be attained by higher working norms; the correct way is via improved production characteristics of the animals. The rentability results show a certain profit which can be used for improvement of the production base including the breeding animals.

The analysis showed the results of the differentiation of the breedings enterprises which should have a motivation function for improvement of the economic results.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia. 4.-5. Sept. 1986. 31-37.

3 tables.

Author's summary.

In CZEC. Summary ENGL.

THE FUR ANIMAL BREEDING AND ITS DEVELOPMENT WITH MEMBERS OF THE SLOVAK UNION OF BREEDERS.

(Sucasny stav a roznoj chovu kozusinových zvierat u organizovanych členov Slovenskeho zväzu chovateľov).

J. Kuban.

The Slovak Union of Breeders formed a Commission of fur animals breeding; its task is to guide this breeding. The concept of development of the fur animals breeding includes the following estimates of fur production in 1995 (pieces):

	1986	1995
nutria	2,851	4,800
fox	4,500	5,200
mink	29,875	50,000

The Slovak Union of Breeders thus fulfils the tasks issued by political and economical authorities.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 25-29.

In CZEC. Summary ENGL.

Author's summary.

**THE EVALUATION OF THE ACTIVITIES IN THE CO-OPERATIVE ASSOCIATION
FOR THE FUR ANIMAL BREEDING IN SLOVAKIA IN THE YEARS OF
7th 5-YEAR PLAN.**

**(Zhodnotenie cinnosti kooperacneho zdruzenia pre chov kozusinovych
zvierat na Slovensku za obdobie 7. päťročnice).**

S. Zatko.

The fur animal breeding ranks among the youngest branches of the animal production in Slovakia. The development of this field was started in the 1970s when the "Draft of the Development of the Fur Animal-Breeding in Slovakia until 1990" was worked out and the new co-operative association came into existence.

The council of the co-operative association is the managing body of the co-operative association. The Plemenársky podnik (The Breeding Enterprise) with the headquarters in Zilina which organizes the work through the advisory activities straight in the breedings concerning the specialist-breeding, technological nourishing, breeding and other matters.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra. Czechoslovakia, 4.-5. Sept. 1986. 13-18.

1 tables.

Author's summary.

In CZEC. Summary ENGL.

CONDITIONS AND PROSPECTS OF THE FUR ANIMAL BREEDING IN POLAND.

(Stav a perspektivy chovu kozusinovych zvierat v Polsku).

K. Klimowicz.

The breeding of fur animals has a long tradition; however it was only in 50' that it switched into an industry. The main species of fur animals in Poland are: blue fox, silver fox, raccoon, nutria, ferret and rabbit. They are bred at both private and state-owned farms. The private breeders belong to either of the two organizations: Polish Union of Small Animal Breeders and National Association for breeding of Small Animals.

The breeding of fur animals brings a profit of 50 mill \$ per year.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 45-48.

2 tables.

Author's summary.

In CZEC. Summary ENGL.

**POSSIBILITIES OF THE DEVELOPMENT OF FUR ANIMALS BREEDING IN
YUGOSLAVIA**

(Moznosti rozvoja chovu kozusinovych zvierat v Juhoslávii).

A. Dudas.

The program of the long-term development of the nutria breeding in Yugoslavia was taken over, in 1985, by the Institute for Production Animals Breeding of the University in Novi Sad in Co-operation with the Hide Industry at Vrhnika. These institutions provide for realization of three projects:

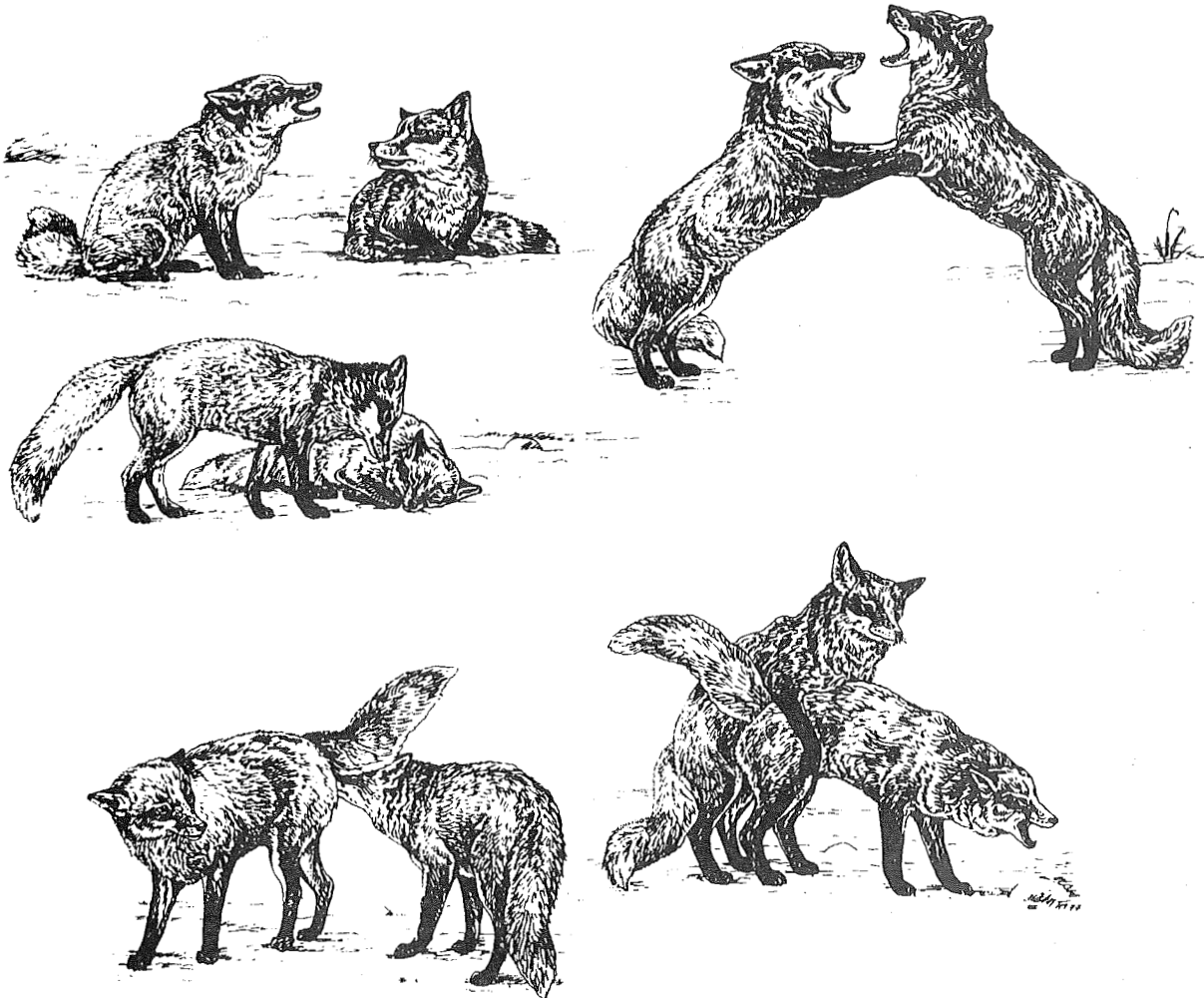
1. The investigation of the influence of higher levels of the sulphur containing amino acids on performance parameters in nutrias.

2. Research of techniques of nutria breeding.
3. Influence of the silicon compounds on the quality of nutria fur.

The paper also shows the basic data concerning the nutria and minks production in Yugoslavia.

On the occasion of the 10th anniversary of the beginning of mass breeding of nutrias in Yugoslavia, an international conference "Nutria 87" will take place in Novi Sad in June 1987. The organizers are inviting the specialists from the whole world to that event.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 49-52.
In CZEC. Summary ENGL. Author's summary.





**CHROMOSOMAL POLYMORPHISM IN THE BLUE FOX (ALOPEX LAGOPUS)
AND ITS EFFECTS ON FERTILITY.**

O.M. Møller, N.N. Nes, M. Syed, J.A. Fougner, K. Norheim, A.J. Smith.

The effects on fertility of centric fusion between 2 of the 4 acrocentric chromosomes (pairs 23 and 24) were investigated in the blue fox (*Alopex lagopus*). A total of 280 males and 814 females from 4 farms was examined. It is concluded that the three karyotypes ($2n=48$, 49 and 50) have approximately the same survival and reproduction rates. Litter size for the centric fusion heterozygotes ($2n=49$) was similar to that for the homozygous animals. There is, therefore, at the present time no advantage to be gained by breeders in using knowledge of the chromosome constitution of their blue foxes for the selection of breeding stock.

Hereditas, 102, 159-164, 1985.

6 tables, 27 references.

Authors' summary.

**A SYMMETRY AND RESOLUTION OF THE SYNAPTONEMAL COMPLEX IN
THE XY PAIR OF CHINCHILLA LANIGER.**

A.J. Solari, M.I. Rahn.

The meiotic behaviour of the XY pair of the chinchilla (*C. laniger*) has been studied with C-banding and with the microspreading procedure for synaptonemal complex (SC) karyotyping. The large X chromosome of the chinchilla has a paracentromeric and two subterminal (st1 and st2) C+ bands, while the minute Y chromosome has a C+ long arm. At metaphase-I the X chromosome is associated end-to-end with the short arm of the Y chromosome. The appearance of the X axis in microspread spermatocytes is delayed up to early pachytene. The X axis, as well as the Y axis appear as thick, separated threads. The thick X and Y axes are then co-aligned without forming a SC. The Y axis becomes thinner and then a asymmetrical SC formed between the axes. This SC becomes symmetrical by a later thinning of the corresponding part of the X axis. During mid-pachytene and additional SC is formed at the other end of the XY pair in many cells. During late pachytene the SCs become resolved and finally the four termini are separated from each other although they tend to be located in the same region of the nucleus. These observations suggest that the SCs in the XY pair of the chinchilla are formed between non-homologous regions. The presence of non-homologous synapsis suggests that the XY pair of *C. laniger* is joined by an achiasmatic mechanism, different from the chiasmatic joining usually found in eutherian mammals. The presence of subterminal C+ bands in the X chromosome may be a hindrance for the formation of a SC during early pachytene. It is concluded that the XY pair of the chinchilla shows an intermediate behavior when compared to that of the sand rat on one side, and that of most mammals having a euchromatic X chromosome, on the other side.

Genetica, 67, 63-71, 1985.

1 table, 13 figs., 30 references.

Authors' abstract.

INFLUENCE OF NORWEGIAN TYPE BLUE FOX MALES ON SOME PERFORMANCE FEATURES OF DOMESTIC POPULATION.

(Vplyv samcov Norskeho typu na niektore uzitkove vlastnosti domacej populacie polarnych lisok modrych).

M. Starek.

An analysis of performance features of blue fox domestic population showed that expected values of live weight and reproduction have been attained by "inter se" coupling. There was one negative appearance, namely the base hair of the progeny tended to thinning. We tried to correct this by using blue fox males of Norwegian type for coupling during 2-3 years (this type has a short hair with very dense base).

The coupled males had a positive influence on increase of live weight of progeny and on the overall quality of furs, mainly, that of the base. On the other hand, the fertility was lower.

Proceedings from: Prospect of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, 145-151.

4 tables.

Author's summary.

GENETIC RELATIONSHIP OF CHANGES IN THE STANDARD COLOUR OF SILVER-BLACK FOXES (SPOTS AND STARS) TO DOMESTICATION.

ГЕНЕТИЧЕСКИЕ ВЗАИМООТНОШЕНИЯ СПЕЦИФИЧЕСКИХ ИЗМЕНЕНИЙ СТАНДАРТНОЙ ОКРАСКИ СЕРЕБРИСТО-ЧЕРНЫХ ЛИСИЦ («ПОДПАЛОВ» И «ЗВЕЗДОЧКИ»), ВОЗНИКШИХ В ПРОЦЕССЕ ДОМСТИКАЦИИ

D.K. Belyaev, L.N. Trut.

Data are reported on colour variation arising during a long-term experiment in which foxes were selected for tameness. Yellowish or reddish spots were shown to be controlled by an autosomal recessive gene (ep). This gene was shown to be linked to the S locus, which controls piebald head spotting (previously referred to as "star"). There was some evidence that ep affects the expression of S.

Genetika, USSR, 22, 1, 119-128, 1986.

6 figs., 8 tables, 10 references.

CAB-abstract.

In RUSS. Summary ENGL.

NUCLEAR AND NUCLEOLAR VOLUMES IN ADRENAL RETICULAR ZONE OF WILD AND DOMESTIC SILVER FOXES VULPES FULVUS UNDER DIFFERENT LIGHTING REGIMES.

N.D. Lutsenko, L.N. Ivanova.

The adrenal cortex was investigated in eight-month silver foxes, selected and not selected for the domestic type of behavior and maintained under different lighting regimes. A significant increase was noted in the activity of the adrenal-cortical reticular zone in relatively wild foxes under conditions of supplemental illumination (20 h light/day) compared with relatively wild control animals. A regime of supplemental illumination caused no marked changes in the adrenal-cortical reticular zone in domestic silver foxes. A regimen of darkness had no significant influence on

the morphological parameters of the condition of the reticular zone in foxes of both behavioral types.

Journ. of evolutionary biochemistry and physiology, New York, N.Y. Consultants Bureau, Jan/Feb. 1985, 21, 1, 32-34.

0022-0930/85/2101-0032., 1985 Plenum Publ. Corp.

Translated from Zhurn. Evolyutsionnoi Biokhimii i Fiziologii, 21, 1, 40-43. 1985. (In ENGL).

1 table, 11 references.

Authors' summary.

RELATIVE HYPERTROPHY OF THE RIGHT HEART VENTRICLE IN SILVER FOXES SELECTED FOR DOMESTICATION BEHAVIOR.

ОТНОСИТЕЛЬНАЯ ГИПЕРТРОФИЯ ПРАВОГО ЖЕЛУДОЧКА СЕРДЦА У СЕРЕБРЯНО-ЧЕРНЫХ ЛИСИЦ, СЕЛЕКЦИОНИРУЕМЫХ НА ДОМЕСТИКАЦИОННОЕ ПОВЕДЕНИЕ

N.K. Eriskovskaya, T.A. Leontyeva, Yu G. Cellarius, L.N. Trut, D.K. Belyaev.

Silver foxes selected for domestication behavior were found to have relative hypertrophy of the right heart ventricle, which was 21% as enlarged in males and 18% as enlarged in females as compared with non-domesticated hypertrophy occurs mainly at the expense of an increase in absolute and relative content of myofibrils in cardiomyocytes, with the absolute total volume of the mitochondria being equal both in domesticated and non-domesticated animals. It was shown by means of dissociated cell counts that in both animal groups, the absolute number of cardiomyocytes and their nuclei in the right ventricles is approximately similar. It is suggested that there is a relationship between right heart ventricle hypertrophy in domesticated foxes and variation in the balance of sympathetic and parasympathetic effects.

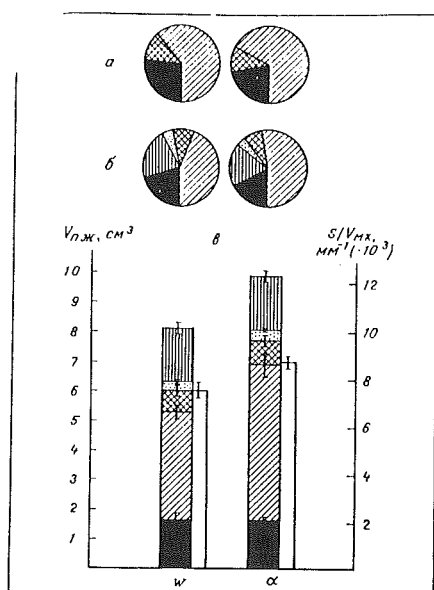


Рис. 1. Относительные и абсолютные соотношения структурных компонентов миокарда ПЖ сердца у недоместицируемых (w) и доместцируемых (d) лисицы.

Черные участки — суммарный объем митохондрий ($V_{мх.}$), косая штриховка — суммарный объем миофибрилл $V_{мф.}$, перекрестная штриховка — суммарный объем прочих компонентов кардиомиоцитов ($V_{пр.}$), точки — суммарный объем капиллярного русла ($V_{к.}$), прямая штриховка — суммарный объем стромы миокарда ($V_{ст.}$), светлые столбики — отношение поверхности митохондрий к их объему ($S/V_{мх.}$).

a — относительные объемы внутри мышечных волокон, б — относительные объемы во всей ткани миокарда, в — абсолютные суммарные объемы структурных компонентов миокарда ПЖ (по оси ординат слева) и отношение поверхности к объему митохондрий (по оси ординат справа) у лисиц-самцов.

Byul. Eksperimental'noi Biologii i Meditsiny, 100, 7, 120-124, 1985.

2 tables, 2 figs., 14 references.

Authors' abstract.

In RUSS. Summary ENGL.

HOMOLOGY OF CHEDIAK-HIGASHI SYNDROME IN HUMANS, CATS, AND MINK.

Jocelyn D. Penner, David J. Prieur.

Chediak-Higashi syndrome (CHS) is an autosomal recessive disease characterized by incomplete oculocutaneous albinism, bleeding tendency, increased susceptibility to infection, enlarged granules including lysosomes in many cell types, and other abnormalities. The underlying biochemical defect in CHS is unknown. Similar diseases, all termed CHS, have been reported in six species including man, cats, and mink. We used interspecific genetic complementation analysis after somatic cell hybridization to determine if the disease in these three species is homologous. Fibroblasts from CHS and controls were cultured and the percentage of cells forming paracrystals after incubation with 25 µg/ml vinblastine sulfate was measured. Fibroblasts of controls ranged from 95-97% whereas fibroblasts of CHS ranged from 52-65%. Fibroblasts were differentially labelled with fluorescein and rhodamine isothiocyanate, fused with polyethylene glycol, and the dual labelled heterokaryons were collected with a fluorescence activated cell sorter. Paracrystal formation in CHS human x CHS human x CHS mink heterokaryons were 55% and 46%, respectively. This lack of complementation indicates that CHS in these three species are the result of mutations at the homologous genetic loci. (Supported by NIH Grant RR00515).

Proceeding of the Society for Expt. Biology and Medicine, 181, 1, 196, 1986. (Only Abstract).

Authors' abstract.

USE OF THE WHITE ARCTIC FOX IN FOX BREEDING.

(Användning av vit polarräv i rävaveln).

Einar J. Einarsson.

An illustrated account is given of the results of crossing white arctic foxes with blue and silver foxes.

Våra Pälsdjur, 57, 2, 52-56, 1986.

3 tables, 15 colour photos.

In SWED.

CAB-abstract.



Original Report

Plasma-Progesterone-Assay, a practical Method for Ovulationdetection in Blue Fox (*Alopex lagopus*)

H. A. P. Urlings, Fur Animal Veterinarian, Kaar 1, 5374 JX Schaijk, The Netherlands.

P. N. G. M. van Beek and H. M. J. F van der Heijden, Animal Health Service, Molenwijkseweg 48, 5282 SC Boxtel, The Netherlands.

Introduction

In 1983 artificial insemination in foxes was started in Holland. Since 1984 a method for ovulation detection by means of plasma-progesterone-assay was researched for Blue Foxes. In scandinavian countries and in Holland up till 1986, mainly measuring the electrical resistance of vaginal mucose is used to determine the optimal moment for artificial insemination. Practical disadvantages of electrical resistance measuring are the individual variations and the fact that daily intra-vaginal manipulation from hygienic point of view is rejectable.

In Holland good breeding results could be achieved in dogs by means of ovulationsdetection using plasma-progesterone-assay (Van Lier, 1985).

Materials and methods

On 2 foxfarms in Holland, development of oestrus in Blue Foxes was checked 2 or 3 times a week by visual control on swelling and colour of the vulva. Using this method, predicting the end of pre-oestrus or start of oestrus, could be achieved (Urlings, 1985). From the moment of decrease of vulva-swelling and colourchange of the vulva from slightly pink towards purple, bloodsamples were collected for progesterone-assay.

Bloodsamples were collected by cutting a small piece of a toenail and collecting a few drops of blood in capillaries (coated with heparine). Depending on progesterone-assay results, artificial insemination was carried out according the following scheme (table 1).

Table 1. Plasma-progesterone-concentration and moment of artificial insemination.

Plasma-progesterone-concentration (ng · ml ⁻¹)	Day of insemination (days after collecting blood-samples)
< 10	new bloodsampling needed
10-15	3 and 5
15-30	2 and 4
30-45	1 and 3
> 45	0 and 2

In case of low progesterone concentrations (< 10 ng · ml⁻¹), 2-3 days later new bloodsamples were taken.

For comparison reasons electrical resistance of vaginal mucosa was recorded of all animals using »Brunst-Maler SJ-LJ3«.

Plasma-Progesterone-assay method

Progesterone was assayed in an enzyme-immuno assay as described earlier for bovine milk samples (Van de Wiel, 1978) without an extraction procedure and some other modifications.

Plasma samples were diluted 1/400 in assay buffer (phosphata buffered saline pH 7.2, containing 0.1 w/v % Bovine Serum Albumine and 0.02 w/v % thimerosal) by adding 10 µl of plasma to 390 µl of assay buffer using an autodiluter.

Of each diluted sample 100 µl was transferred in duplicate to the wells of a microtiterplate, coated with the IgG-fraction of a pool of rabbit antisera raised against progesterone (van de Wiel, 1979). In every plate progesterone standard samples (0, 25, 50 100 and 200 pg progesterone ml⁻¹) con-

taining 0.25% steroid-free foxplasma were tested in quadruplicate.

To each well 25 μ l of peroxidase-labeled progesterone (20 ng HRP-6-P ml⁻¹) was added. The contents of the plate were thoroughly mixed by shaking the plate on a plate-shaker.

The plates were incubated for 75 minutes at 37° C.

After the incubation period the plates were washed 5 times with demineralised water containing 0.05 v/v% tween 80. 150 μ l of freshly prepared substrate solution (0.096 mg tetra-methylbenzidine ml⁻¹, 0.004 v/v% H₂O₂ om acetate-citrate buffer pH 5.5) was pipetted in each well.

The plates were then incubated for 40 minutes at room temperature. The reaction was stopped by adding 50 μ l 4N sulphuric acid to the wells.

The optical density was measured using a multi-skan photometer (λ 450 nm) linked to a Hewlett Packard HP-86B personal computer. The optical densities were plotted against the standard amounts of progesterone and a standard curve was fitted by the computer using a logic-log transformation.

The amount of progesterone present in the samples was then interpolated in the standard curve.

Results and discussion.

During the mating season of 1986, of two fox-farms in Holland 204 bloodsamples of Blue Foxes in oestrus were assayed for progesterone. From 5 of 6 days prior to ovulation till ovulation, progesterone concentration increased from less than 10 ng·ml⁻¹ to more than 70 ng·ml⁻¹ (table 2 and graph 1). In all tables (except table 1) and graphs, the moment of whelping is stated as day 0, day numbers are stated as days before whelping.

The results in table 2 show relatively high standard deviations. For to this phenomenon 2 factors can be held responsible:

1. Pregnancy periods of Blue Foxes may vary from 50 to 56 days (Konnerup Madsen, 1980); limited Dutch data indicate 51 to 55 days (Urlings, 1985).
2. Progesterone-assay results show variation. From different animals, 10 respectively 12 bloodsamples of each animal were taken on the same moment and assayed on progesterone-concentration (table 3).

Table 3. Plasma progesterone-concentration in 10 and 12 samples of individual animals at the same time.

	Plasma-progesterone-concentration (ng·ml ⁻¹)	
	10 samples	12 samples
\bar{X}	51.78	62.38
s.d.	6.38	7.90
variance	12.34%	12.67%

Graph 1 shows a rapid increase in progesterone-levels from day 58 (before whelping) up till day 55, followed by a period of moderate increase. After day 54 a second rapid increase was found. Similar results were found by Möller c.s. (1984).

The first phase of increase suggests beginning of luteinisation of pre-ovulatory cells, the third and more rapid phase of increase may be caused by luteinisation of follicular cells at the time of ovulation. Further investigation on this phenomenon is required.

To get an idea of the insemination-efficiency, i.e. number of inseminations per animal and days of

Table 2. Plasma-progesterone concentration of Blue Foxes in oestrus.

Days before whelping	n	\bar{X} (ng·ml ⁻¹)	s.d.	SEM
58	7	5.7	7.4	2.6
57	23	14.9	15.0	3.1
56	42	25.4	22.4	3.5
55	52	40.2	23.8	3.3
54	28	45.0	20.5	3.9
53	28	64.0	16.2	3.1
52	24	69.0	16.7	3.4

n = number of animals tested.

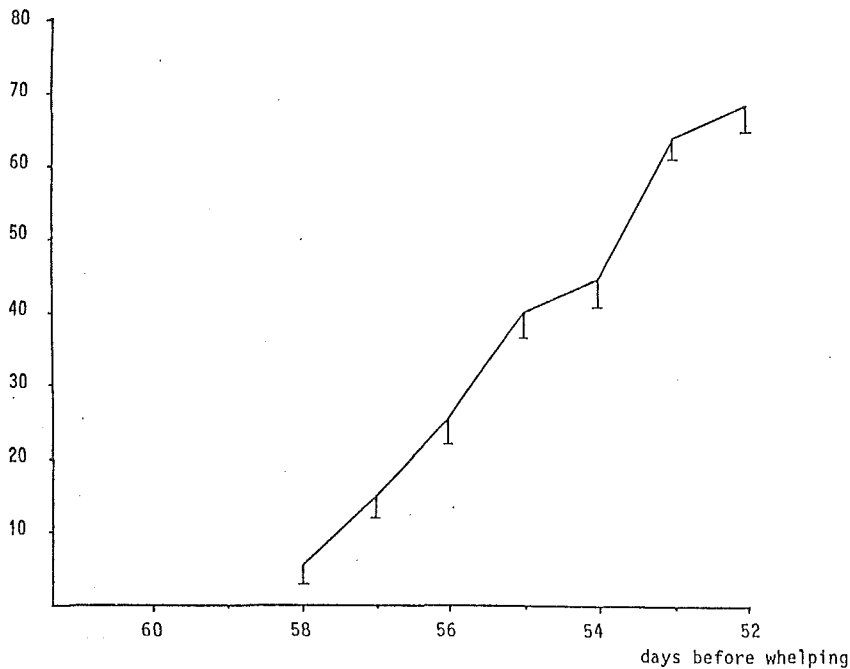
\bar{X} = average plasma-progesterone concentration.

s.d. = standard deviation.

SEM = standard error of the mean.

progesterone
(ng.ml⁻¹)
± S.E.M.

Graph 1. Plasma-progesterone-concentration of Blue Foxes in oestrus.



inseminations, of the same animals plasma-progesterone-concentrations and electrical resistance of vaginal mucosa were recorded. Usually insemination on basis of electrical resistance is carried out on the first day when a decrease of more than 50 Ohms is recorded, and a second insemination two days later if the decrease of resistance is consistent.

If electrical resistance rises again, the second insemination is carried out only after resistance has decreased again more than 50 Ohms; in those cases a third insemination is carried out two days after, if the decrease is consistent. Using this schedule a calculated number of inseminations per animal on basis of electrical resistance can be given (table 4).

An average of about 2.5 inseminations per animal can be achieved on the basis of electrical resistance recording.

Table 4. Calculated number of inseminations per animal using resistance recording.

No of insemin.	0	1	2	3	4	5
No of animals	3	0	128	57	16	1
% inseminated	1.5	-	62.4	27.8	7.8	0.5

Insemination on basis of plasma-progesterone-concentration was carried out according to table 1. All animals were inseminated twice.

Using plasma progesterone concentration for ovulation detection, 91% of all inseminations

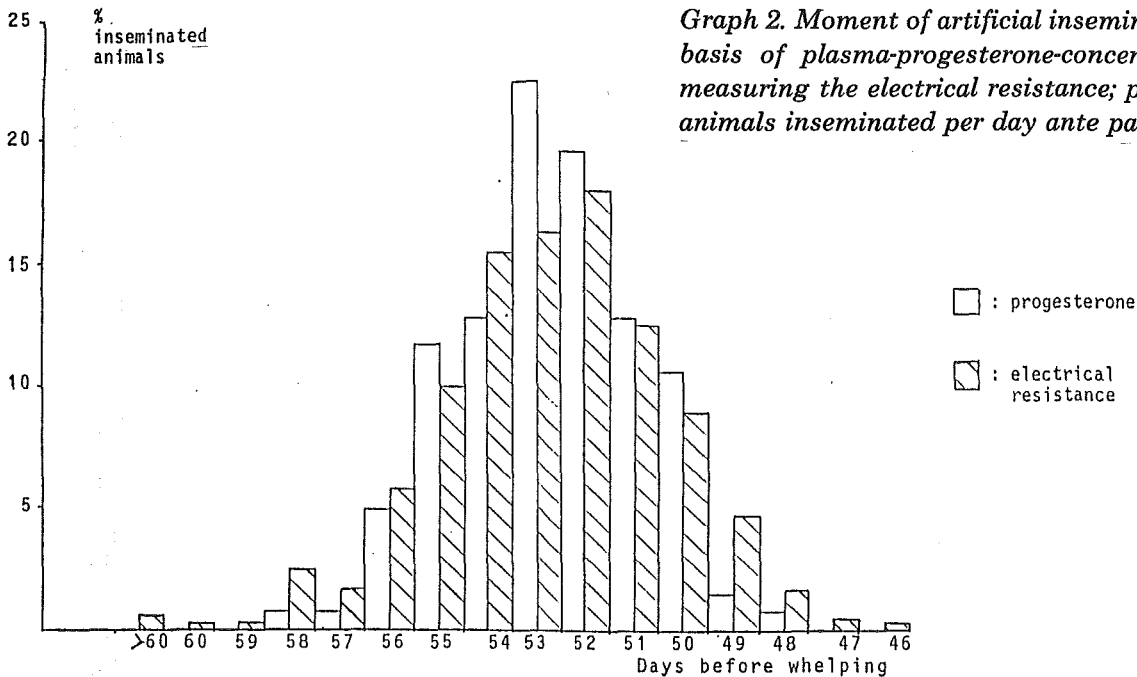
could be carried out between 50 and 55 days before whelping (graph 2). Using electrical resistance measuring, 88% of all inseminations would have been carried out between 50 and 55 days before whelping (graph 2).

The mean moment of insemination using plasma progesterone concentration was 52.7 days before whelping, with a s.d. of 1.8. Using electrical resistance measuring the mean insemination time was 52.9 days before whelping with a s.d. of 2.9. There is a great difference between both standard deviations and it seems to be more reliable to do ovulation detection on the basis of plasma progesterone concentration than on electrical resistance measuring.

From recent Dutch research on visual oestrus detection (Urlings 1985) at Blue Foxes, indications were received, that for approximately 60% of the Blue Foxes a single plasma progesterone-assay will be sufficient to determine the optimal moment for artificial insemination. The use of electrical resistance measuring for that group of animals is thus no longer necessary.

Additional bloodsamples can further exclude the use of electrical resistance measuring. An estimated number of 1.5-2.5 bloodsamples, depending on experience with visual oestrusdetection, will be sufficient for efficient ovulationdetection.

Furthermore plasma-progesterone-assaying can be of great help, especially at the end of the mating season and for unexperienced farmers, to determine if animals have or haven't passed oestrus period.



Graph 2. Moment of artificial insemination on the basis of plasma-progesterone-concentration and measuring the electrical resistance; percentage of animals inseminated per day ante partum.

Conclusions

1. Ovulation detection by means of plasma-progesterone-assay can give a positive contribution to artificial insemination of Blue Foxes.
2. Further investigations are required to evaluate single artificial insemination results in foxes on the basis of plasma-progesterone-concentration.
3. Hygienic problems and traumatic injuries of the female reproductive tract caused by measuring electrical resistance, can be drastically reduced.
4. Plasma-progesterone-assay can be carried out with only a few drops of blood, which can easily be collected by the farmer by clipping a toenail.
5. Using plasma-progesterone-assay will reduce work and time in the mating season. For the farmer daily measuring, recording and interpreting electrical resistance data can drastically be reduced.
6. For Blue Foxes, collecting bloodsamples for plasmaprogestosterone-assay, twice a week on a farm may be sufficient.
7. For practical use of plasma-progesterone-assay, adequate lab-facilities and daily assaying are essential. On the same day, bloodsamples are collected, the assay-results must be known.
8. In case of doubt, whether an animal has passes oestrus period («silent heat») plasma-progesterone-assay can be of help.

References

1. Konnerup-Madsen, H. og Mogens Hansen, 1980. Blåraeven. Dansk Pelsdyravlerforening. Danmark.
2. Lier, J. J. van 1985. De waarde van de melkprogesteronbepaling in het perifere bloed, het sexueel gedrag van de teef, de vagina cytologie en de vaginascopie om het optimale dek-tijdstip van de teef te bepalen. Referaat. Institute of Obstetrics Gynaecology and A. I. Veterinary University Utrecht.
3. Möller, O. M.; Mondain-Monval, M.; Smith A.; Metzger, E.; Scholler, R. 1984. Temporal relationships between hormonal concentrations and the electrical resistance of the vaginal tract of blue foxes (*Alopex lagopus*) at pro-oestrus and oestrus. *J. Reprod. Fert.* 1984, 15-24.
4. Urlings, H. A. P. 1985. Kunstmatige inseminatie bij de blauwvos (*Alopex lagopus*). Referaat. Institute of Obstetrics, Gynaecology and A. I. Veterinary University, Utrecht.
5. Wiel, D. F. M. van de, Eldik, J. van, Koops, W., Postma, A. and Oldenbroek, J. K. (1978): Fertility control in cattle by use of the milk-progesterone test, *Tijdschr. Diergeneesk.* 103, 91-103.
6. Wiel, D. van de, Komanplatana M., Ngram-surijaroy, Ch., Kopps, W, Singhajan, S. (1982): Enzyme Immunoassay of milkprogesterone: its application to oestrus confirmation and early pregnancy diagnosis in cattle. *The Vet. Quart.* 1982, 4, 2, 72-78.

Articop Method for Artificial Insemination of Foxes

Seppo Pasanen, Department of Biology, University of Joensuu, Finland

The history of the artificial insemination of foxes is young. Although the first experiments were done in the Soviet Union as early as the early 1930's (Starkov 1934), a satisfactory method was developed not until the beginning of the 1970's (Aamdal et al. 1972). This method is intrauterine. Semen must be conveyed through the cervix into uterus using a speculum and catheter. The method is good, but it requires much training and experience, and it is not easy to learn this method for the average farmer.

The study of fur animals began in the University of Joensuu in 1980 (Helle et al. 1982), and the artificial insemination of the fox came into the program of study in 1982 (Hernesniemi et al. 1982 a, b). At first we inseminated using the catheter method, but in 1982 we began to develop a new method, whose main idea was to imitate natural copulation and to inseminate into the vagina (Meriläinen and Pasanen 1983).

In 1982, we inseminated altogether about 70 females from which about 25 were inseminated by this new method. The females (*Alopex*) were first copulated by the male (*Alopex*), and usually after one day artificially inseminated by sperm of the fox (*Vulpes*). In this first experiment six litters were produced by artificial insemination. Because of the limitations in the material, the percentage of pregnancy and litter size could not be calculated, but the most important result of this first experiment was that the intravaginal inseminating method was successful.

In 1983-86 the development of the Articop method was continued (Pasanen 1983, 1985; Pasanen et al. 1984). Each year more farms participated in the study, and the results became better and better (Fig. 1).

In 1984 we trained eight average farmers to inseminate their foxes in their own farms. They inse-

minated 210 females. The percentage of pregnancy was about 45% and the litter size was 2.2 cubs per inseminated female. These results encouraged us to continue. In 1985 there were 58 and in 1986 158 farmers who inseminated their own animals. In 1985 all farmers reported their results (Fig. 1), but in 1986 there were three farmers who did not report and one farmer who reported defectively. There were big differences between farmers (Fig. 2), but on average the results were satisfactory.

The majority of inseminations were done using the polar fox (*Alopex*) as a female and the fox (*Vulpes*) as a male (Table 1). In these interspecific inseminations, the litter size was 4.0 cubs per inseminated female. The interspecific insemination of *Alopex* (male) x *Vulpes* (female) is not recommended. When the inseminations are grouped according to insemination date, we can find that for instance the inseminations of *Vulpes* x *Vulpes* are not recommended in the late spring (Table 2).

Table 1. The results according to the type of the insemination in 1986.

	N	%	A	B
<i>Vulpes</i> x <i>Vulpes</i>	1365	64.1	2.32	1.99
<i>Alopex</i> x <i>Alopex</i>	77	76.6	5.89	5.06
<i>Vulpes</i> x <i>Alopex</i>	6806	63.0	4.06	3.23
<i>Alopex</i> x <i>Vulpes</i>	14	42.9	1.43	1.00
Mixed insemination	44	84.1	6.91	5.84
Articop + catheter	32	93.7	7.75	5.38
Artificial insemination only	8338	63.5	3.81	3.06
Insemination + copulation	1169	82.1	5.94	5.08

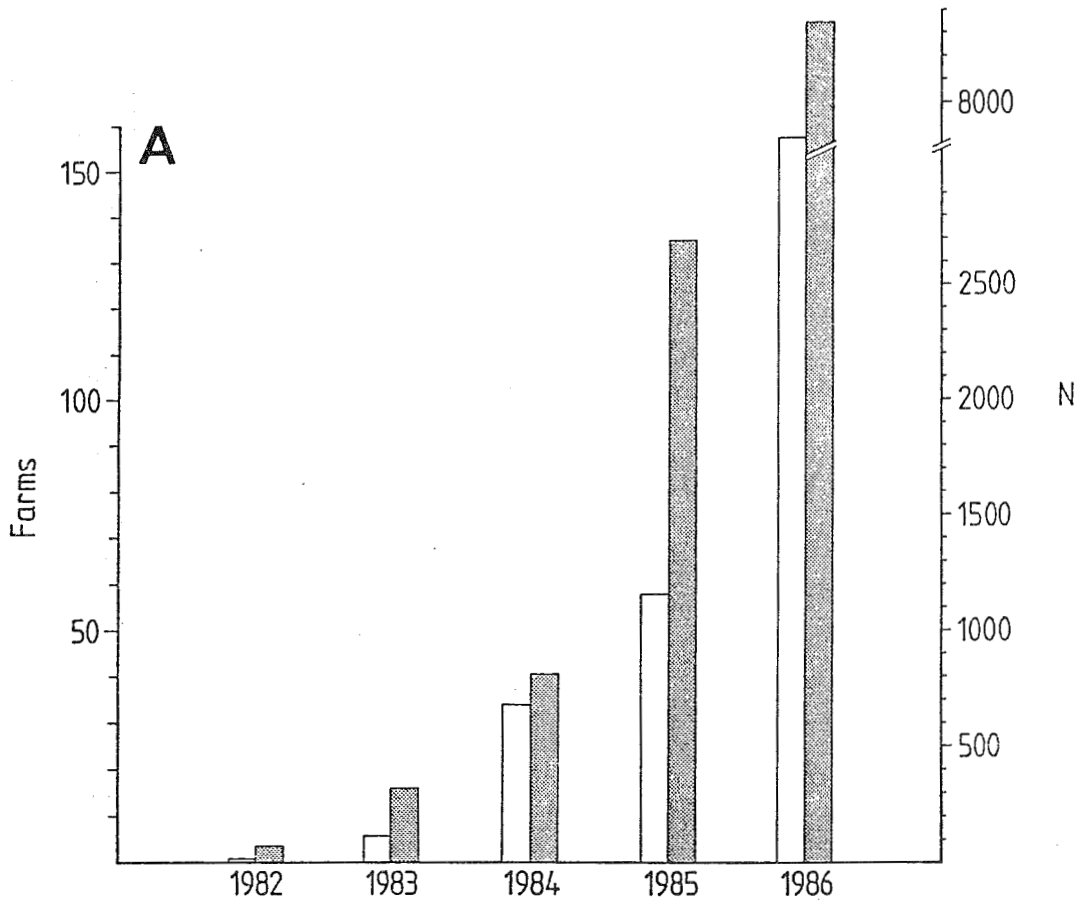
N = number of inseminations,

% = percentage of pregnancy

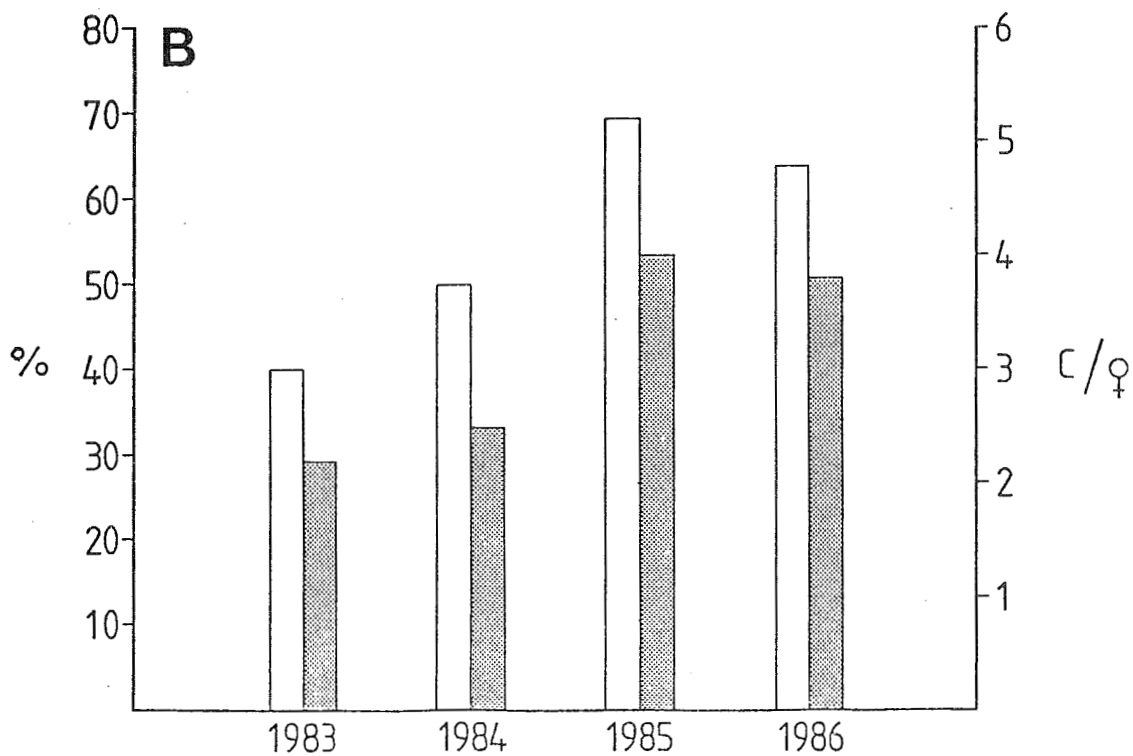
A = cubs per inseminated female (bearing),

B = cubs per inseminated female (weaning).

Fig. 1. The advancement of the study.



A. The number of the farms (white columns) and inseminated animals (N, grey columns) in 1982-1986.



B. The percentage of pregnancy (white columns) and litter size (cubs per inseminated female, grey columns) in 1983-1986.

Fig. 2. The results of the different farmers in 1986. Farmers are arranged on the x-axis according to the number of their inseminated foxes.

N = the number of the inseminated foxes, *F* = Farm's No.

% = the percentage of pregnancy.

A = cubs per inseminated female (bearing).

B = cubs per inseminated female (weaning).

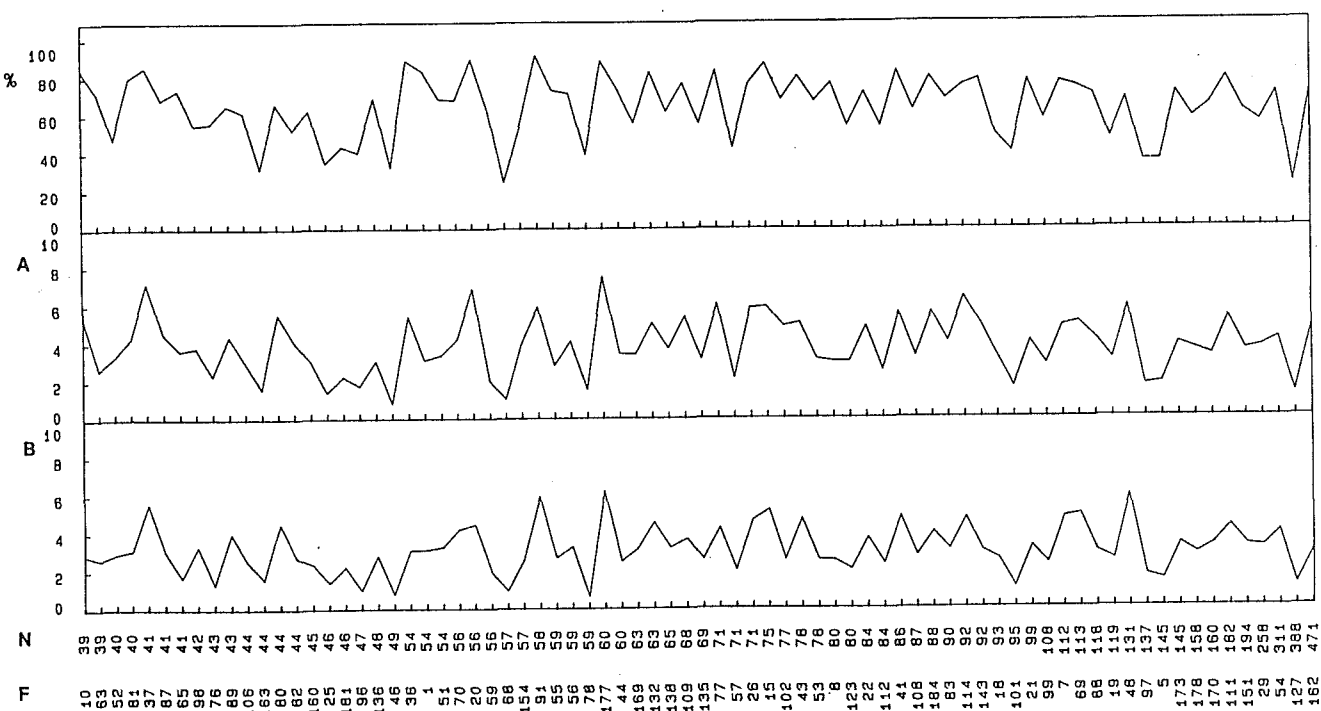
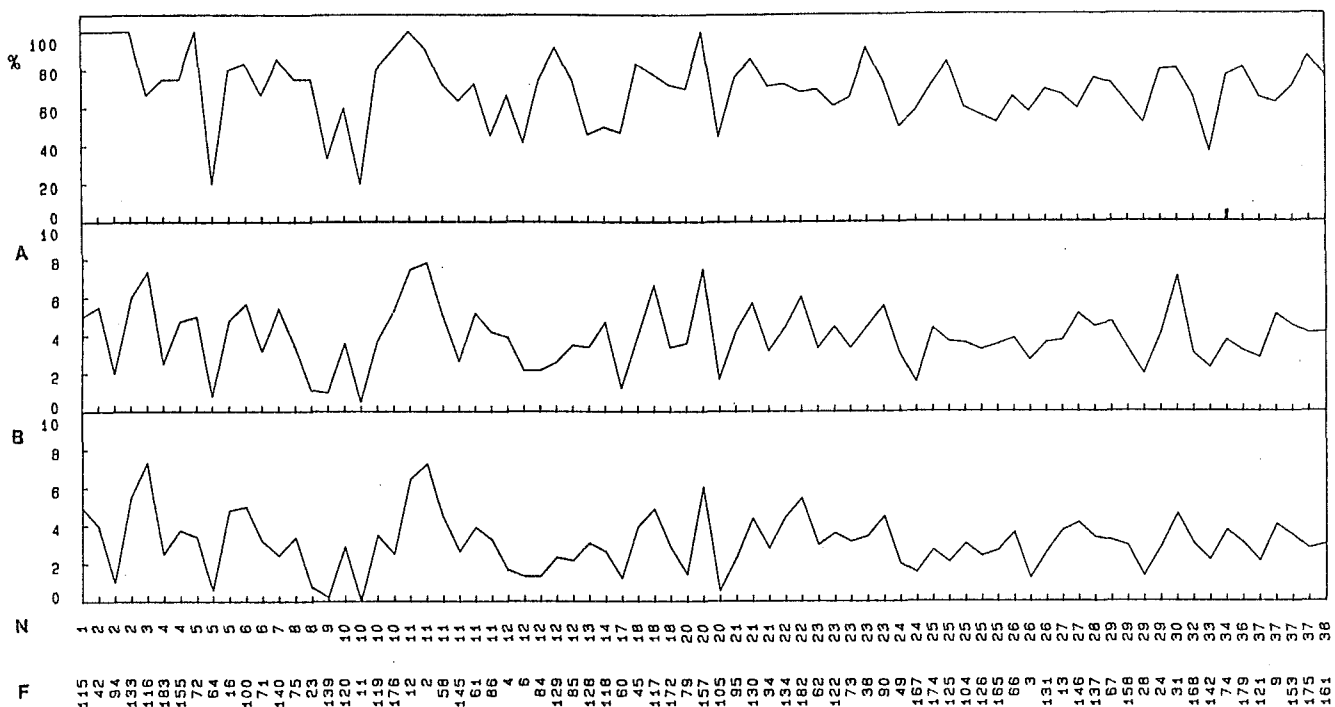


Table 2. Effect of the insemination date.

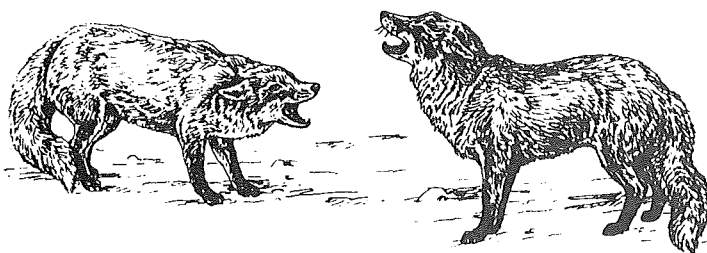
	N	%	A	B
Vulpes x Vulpes				
- February	51	70.6	2.57	2.45
- 1. - 16.3.	301	76.1	3.11	2.71
- 17. - 31.3.	636	64.9	2.37	2.02
- 1. - 15.4.	325	52.3	1.59	1.29
- 16. - 30.4.	27	22.2	0.22	0.22
Alopex x Alopex				
- 1. - 16.3	2	50.0	4.00	2.00
- 17. - 31.3.	14	71.4	3.64	3.64
- 1. - 15.4.	22	72.7	6.23	5.59
- 16. - 30.4.	32	81.3	6.28	5.09
- May	3	66.7	9.00	7.33
Vulpes x Alopex				
- February	2	100	5.00	5.00
- 1. - 16.3	76	81.6	5.41	3.74
- 17. - 31.3	1548	66.7	4.40	3.48
- 1. - 15.4.	3469	63.2	4.07	3.32
- 16. - 30.4.	1433	55.5	3.52	2.66
- May	62	50.0	3.34	2.47
Insemination + copulation				
- February	53	81.1	3.83	3.68
- 1. - 16.3	152	84.2	4.35	3.73
- 17. - 31.3	355	84.2	5.63	4.90
- 1. - 15.4.	423	83.0	6.78	5.72
- 16. - 30.4.	160	72.5	6.41	5.64
- May	4	50.0	1.50	1.25

See key for Table 1.

References

- Aamdal J., Andersen K. & Fougner J. A. 1972: Insemination with frozen semen in the blue fox. - VII Int. Congr. Anim. Reprod. A. I. Munich 2: 1713-1716.
- Fougner J. A. 1984: Artificial insemination of foxes (*Vulpes vulpes* and *Alopex lagopus*) 4 years of practical use in Norway. - 3rd. Int. Congr. in Fur Animal Production, Versailles 24.
- Helle p., Hernesniemi V., Lumme J., Meriläinen J. & Pasanen S. 1982: Ketun ja naalin tuotantoa tukeva perinnöllisyystieteellinen ja fysiologinen tutkimus. - *Turkistalous* 54 (6): 301-302.
- Hernesniemi V., Lumme J., Meriläinen J. & Pasanen S. 1982 a: Spermanotto ketun ja naalin Keinosiementämistä varten. *Turkistalous* 54 (6): 374-375.
- Hernesniemi V., Lumme j., Meriläinen J. & Pasanen S. 1982 b: Kokemuksia ketun ja naalin keinosiementämisestä. - *Turkistalous* 54 (10): 477-478.
- Meriläinen J. & Pasanen S. 1983: Artificial insemination of the fox by means of initiating natural population. - *Publ. Univ. Joensuu* 17: 1-4.
- Pasanen S. 1983: Ketun ja naalin keinosiementäminen luonnonparitusta mukailevalla tavalla. - *Univ. Joensuu, Publ. Karelian Inst.* 54: 1-19.
- Pasanen S. 1985: Tarhakohtainen keinosiementäminen Articop-menetelmällä vuonna 1985. - *Univ. Joensuu, Faculty of Mathematics and Natural Sciences, Report Series* 7: 1-13.
- Pasanen S., Lumme J. & Meriläinen J. 1984: A new device (Articopinstrument) for the artificial insemination of the fox. - *Scientifur* 8 (1): 49-55.
- Starkov I. D. 1934: Artificial insemination in the fox. - *Itogi. rab vsesojuz. sovesc. iskusst.osem.* 1: 122-130 (in Russian). (Abstract in *Anim. Breed. Abstr.* 1935, 3:287).

SCIENTIFUR, VOL. 11, No. 1, 1987

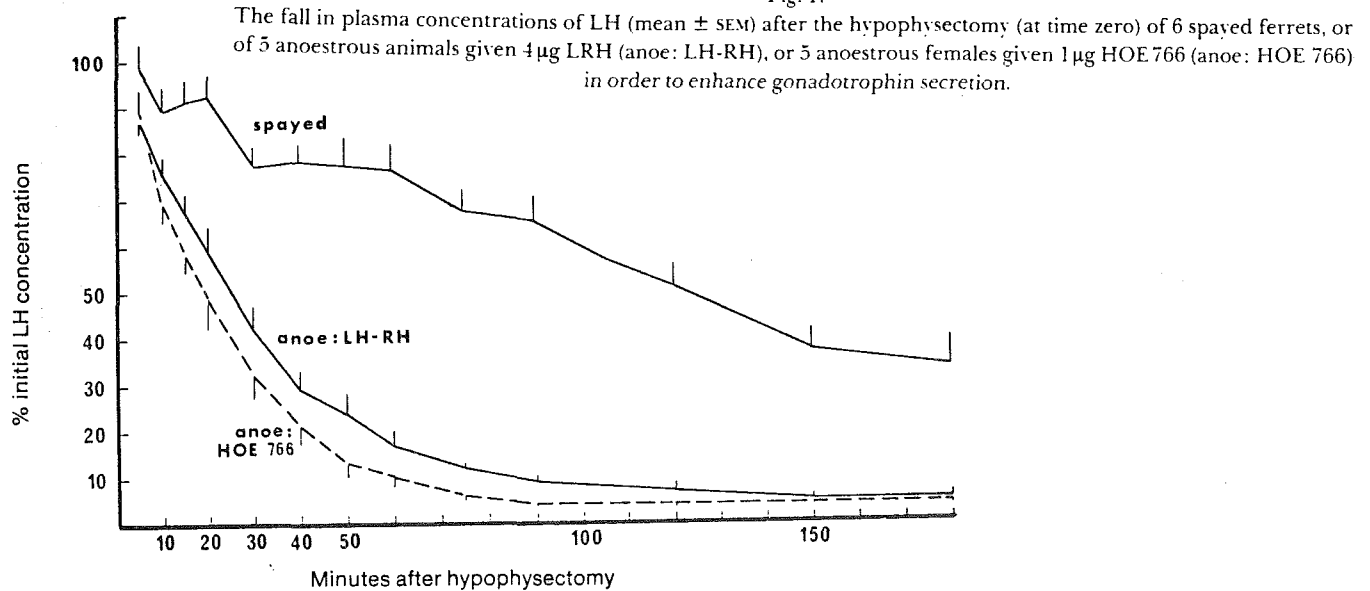


HALF-LIFE OF FSH AND LH IN THE FERRET.

B.T. Donovan, B. Gledhill.

Anoestrous and oestrous ferrets were injected with luteinizing hormone-releasing hormone (LRH) or a long-acting analogue and subsequently hypophysectomized. Spayed ferrets were hypophysectomized without prior treatment with gonadotrophin releasing factor, and serial blood samples collected from all animals in order to follow the rate of decline in plasma gonadotrophin concentration. The half-life of LH in the spayed female (around 2 h) was much longer than that of the hormone released from the hypophysis of anoestrous females by LRH (25 min) or by the analogue (19 min). The half-life of FSH released by LRH or analogue in anoestrous females was approximately 65 min, while that discharged by the analogue in oestrous females was about 4 h. The fall in plasma FSH concentration in spayed females after hypophysectomy was too slow to allow calculation of a half-life.

Fig. 1.



Acta Endocrinologica, 105, 14-18, 1984.
2 figs., 8 references.

Authors' abstract.

HETEROLOGOUS ANTI-PROGESTERONE MONOCLONAL ANTIBODY ARRESTS EARLY EMBRYONIC DEVELOPMENT AND IMPLANTATION IN THE FERRET (MUSTELA PUTORIUS).

V. Rider, R.B. Heap.

Early embryo development and implantation were arrested in ferrets passively immunized with a mouse monoclonal anti-progesterone antibody injected intraperitoneally at 72 and 96 h post coitum (p.c.) only. In control ferrets injected with mouse serum or 0.9% NaCl, implantation sites were found in all mated females; autopsies were carried out at Day 14 p.c. A total of 34 unimplanted embryos were recovered from the reproductive tract of antibody-treated ferrets and none of these had progressed to the blastocyst stage.

When ferrets were treated with antibody at 72 h p.c. and autopsies were carried out at Day 6 p.c., only 1 of 29 embryos recovered had progressed beyond the 4-cell stage in 4 females. In 4 control animals most embryos recovered at Day 6 were at the morula (32%) or blastocyst (28%) stage.

Embryos from ferrets treated with antibody were therefore developmentally arrested when recovered 72 h after antibody administration.

Plasma progesterone concentrations were 6-fold higher in antibody-treated ferrets with unimplanted embryos (711 \pm 132 nmol/l; 223 ng/ml) compared with control pregnant females (102 \pm 4 nmol/l; 32 ng/ml) at Day 14 p.c. The results are consistent with the hypothesis that the normal course of pregnancy is arrested as a result of antibody binding of progesterone in the circulation, presumably causing a decrease in the amount of progesterone available to target cell receptors, and that heterologous anti-progesterone antibody blocks normal cleavage and embryonic development at an early stage before cavitation.

J. Reprod. Fert., 76, 459-470, 1986.
3 tables, 8 figs., 31 references.

Authors summary.

CHANGES IN SERUM PROLACTIN CONCENTRATIONS AND OVARIAN PROLACTIN RECEPTORS DURING EMBRYONIC DIAPAUSE IN MINK.

Jack Rose, James E. Oldfield, Frederick Stormshak.

Experiments were conducted to determine if prolactin receptors were present in the mink ovary, and to examine the relationship between receptor numbers and serum levels of prolactin (PRL) during embryonic diapause and blastocyst reactivation. For analysis of the physicochemical properties of prolactin receptors, ovaries were obtained from anestrus mink. All binding determinations were made using 125 I-ovine prolactin (125 I-oPRL), and 20 μ g of tissue protein from the 100,000 X g particulate fraction. To quantify prolactin receptors during gestation, 20 primiparous mink were mated twice on consecutive days between 4 and 10 March and assigned randomly to one of two groups. Mink in Group 1 (N=8) were killed on 13 March when blastocysts were completing their migration into the uterus and entering a state of diapause. Animals in group 2 (N=10) were killed on 26 March during the period of blastocyst reactivation, just prior to implantation. To determine serum levels of prolactin during gestation, an additional 20 primiparous mink were similarly mated and bled every 4 days from 15 March to 8 April, and then every 7 days until 23 April. Prolactin concentrations were determined by a heterologous double antibody radioimmunoassay using porcine PRL for both tracer and standards.

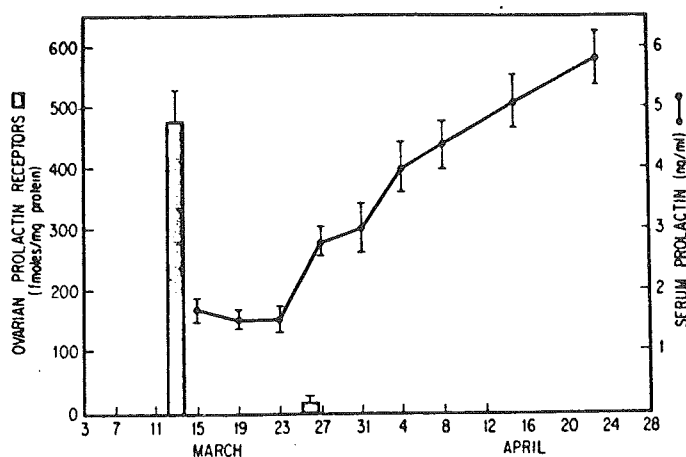


FIG. 3. Serum prolactin concentrations and ovarian prolactin binding during embryonic diapause and blastocyst reactivation.

Optimum conditions for binding ^{125}I -oPRL to ovarian membranes were attained at 25°C after 12 h. Scatchard analysis revealed a single class of high affinity binding sites with a K_d of 6.14×10^{-11} M. The total concentration of receptors during anestrus was 85 fmol/mg protein, which increased significantly during embryonic diapause to 484 fmol/mg protein, then declined to 16 fmol/mg during blastocyst reactivation. Serum levels of prolactin began to increase soon after the vernal equinox (21 March) and were significantly elevated by 27 March. In view of the established role of prolactin as a luteotropin in mink, the observed reduction in number of receptors during blastocyst reactivation may have been due to the occupancy of these sites with endogenous prolactin. These data provide additional evidence that prolactin is an important regulator of ovarian function in mink.

Biology of Reproduction, 34, 101-106, 1986.
3 figs., 38 references.

Authors' abstract.

THE USE OF THE GONADOTROPIC HORMONES AT THE COPULATION OF THE MINKS.

(Použitie gonadotropných hormonov pri parení noriek).

A. Sidlovský.

The so far used method of mating of minks in the two oestral cycles of the female was replaced by i.m. administration of the gonadotropic hormone during the first oestral cycle; a normal mating by a mink male takes place during the second oestral cycle 7 to 8 days later. The results have proved the justifiability of this methods; it caused an increasing of fertility by 6 to 8%, extension of the polygamy to 1:6, and a shortening of copulation period from 3 weeks to 8-9 days.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.5. Sept. 1986. 157-161.
In CZEC. Summary ENGL.

Author's summary.

METHOD OF SEMEN COLLECTION IN NUTRIA MALES BY ELECTROEJACULATION.

(Technika odberu spermy od samcov nutrii elektroejakulaciou).

M. Barta, I. Jakubicka.

The method of semen collection in nutria males by electroejaculation in halothane narcosis was elaborated. Total anesthesia was obtained by halothane inhalation, i.e. 5 per cent mixture with oxygen 2 l per min. Electrical stimulation is done by means of bipolar electrode being introduced into the rectum. Electric voltage needed for ejaculatory reflex as well as impulse number are varied in individual males. On the average, 1.18 ml ejaculate with 76.96 per cent motility and average pH value 6.89 per collection was obtained.

Scientific Works of RIAP in Nitra, XXII, 1986.
1 table, 13 references.

Authors summary.

In CZEC. Summary ENGL, CZEC, RUSS.

**POSSIBILITIES OF PRACTICAL USE OF RIA-METHODS IN CONTROL
OF REPRODUCTION PROCESS IN FUR ANIMALS.**

**(Moznosti praktickeho uplatnenia ria-metod v kontrole reprodukneho
procesu kozusinovych zvierat).**

J. Nitray, I. Jakubicka, M. Barta, V. Parkányi, J. Rafay.

The concentrations of progesterone in blood were studied in nutria and foxes. The characters of variations of progesterone pointed towards a type of ovarian activity that leads to a finding that nutrias do not have any regular cycle of sex activity. It is, however, necessary to the exactness of this findings to determine the organs taking part in production of progesterone.

Analysis of the progesterone concentration in blood of foxes shortly after mating shows possibilities of use of fertility test in this species.

The sensibility of the method and usability of progesterone test in fur animal production was confirmed in the experiments. The fact that progesterone is an objective indication of the functional condition of ovaries and expression of the activity of corpora lutea offers wide possibilities in control of reproduction process by means of that physiological criterion.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, 87-93.

3 tables.

Authors' summary.

In CZEC. Summary ENGL.

USE OF SOME BIOTECHNOLOGICAL METHODS IN FOX BREEDING.

(Vyuzitie niekterych biotechnickych metód v chove lisok).

M. Barta, I. Jakubicka.

The paper shows several biotechnological methods that are being used in breeders' practice nowadays or will be used in future. For a successful conception in foxes, it is vital to evaluate the oestrus, and determine an optimal time for mating or insemination. For breeders' practice, the most suitable method of oestrus detection is measuring of electrical resistance in vaginal excrements by use of ohm-meter. The sperm from male foxes can be gained by means of electroejaculation or masturbation.

Recently, a device for insemination of foxes was designed that provides for imitation of natural mating during insemination. In future, micro-manipulation methods, early embryo transfer and chimerization will be experimentally tested in the reproduction of foxes.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, 103-108.

1 table.

Authors' summary.

In CZEC. Summary ENGL.

METHODS OF DETERMINATION OF OESTRUS IN BLUE FOX (*ALOPEX LAGOPUS*).

(Metody zistovania ruje u polárnych lisok).

O. Szeleszczuk.

The aim of this experiment was to study cytochemical and morphological changes in the epithelium and vaginal mucose of polar vixens during the mating season. A total of 25 females aged 1 year and more were used between 13-27 March.

A significant correlation was found in all females between morphological picture, resistance of the vaginal mucose and other look of sexual organs. These studies have allowed us to define to a sufficient degree the readiness of vixens to be mated or inseminated.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 129-138.

3 figs., 3 tables.

Author's summary.

In CZEC. Summary ENGL.

SOME PROBLEMS OF SPERM LIVABILITY IN EJACULATE OF BLUE FOX (*ALOPEX LAGOPUS*).

(Nektere problemy prezitelnosti spermii v ejakulatu pescu (*Alopex lagopus* L.))

J. Sabrnak.

The results of evaluation of influence of time on the livability of sperm belong to the most important findings in studies of sperm livability in fresh ejaculate of the blue fox. It was found that in the majority group (66.67%) of the ejaculate the sperms survived max. 10 minutes.

The influence of concentration in relation to sampling time of ejaculate was studied simultaneously. The results tend to show a statistically significant positive relation of the ejaculate sampling up to a time interval of 15 minutes after sampling when there is only a low, statistically not significant relation. After 20 minutes, there is only a very low, statistically not significant negative relation.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 139-143.

In CZEC. Summary ENGL.

Author's summary.

CHARACTERISTICS OF THE NUTRIA EJACULATE AFTER REMOVAL OF THE SEMINAL VESICLES.

(Charakteristika ejakulatu nutrii po odstraneni semennych vackov).

I. Jakubicka, M. Barta.

In spite of the extirpation of seminal vesicles in nutria males, ejaculate coagulated immediately after it had been collected by electrostimulation at the voltage of 5 V. The average parameters of the ejaculate collected this way were as follows:

volume-0,87 ml (0,2-1,8), motility-79.06% (60-95),

concentration-146,7. 10^6 /ml (14.4-295,0 . 10^6 /ml),

pH-6,89 (6,19-7,25). Ejaculate obtained at the voltage lower than 5 V was very thin and in such cases asosperm and oligosperm were very frequent

It implies that individual accessory sex glands are not likely to functionate at the voltage below 5 V.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept., 1986, 213-218.

2 tables.

Authors' summary.

In CZEC. Summary ENGL.

MATING METHODS FOR BIG AND SMALL FARMS OF FOXES AND MINKS.

(Metody pripravovania lisok a noriek vo veľkochovoch a drobných chovoch).

J. Maciejowski.

Mating system is described for the fox and mink farms to exclude an increase of inbreeding. The procedure should enable an avoiding of matings between relatives even if the animals are maintained for several years.

In the big farms, both females and males are sorted out into 6 to 8 groups. All the animals being assigned to a particular group remain there till the time of culling. A replacement is performed from neighbouring groups, the females being replaced in an opposite direction than the males. For small farms a rotational exchange of males between 4 groups of females is proposed with partial supplementation (every 3-4 years) of males by purchasing from other farms.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 95-101.

1 table, 2 figs.,

Author's summary.

In CZEC. Summary ENGL.

INCIDENCE OF A CIRCADIAN CYCLE OF PHOTOSENSITIVITY IN THE REGULATION OF THE ANNUAL TESTIS CYCLE IN THE MINK: A SHORT-DAY MAMMAL.

Line Boissin-Agasse, Jean Boissin.

Like the birds or long-day mammals studied up until now the photoregulation of the annual testicular cycle in the mink, a short-day mammal, depends on phase relationships existing between the daily cycle of alternating period of light-dark and the circadian cycle of photosensitivity. Our results show, however, that the characteristics of photoresponse in the mink are exactly the opposite of those of long-day animal species. For long-day species light has a stimulating effect on the central machinery of gonadotropic control (LH-RH) whereas in the mink, the secretion of gonadotropins is induced by short days. Interpreted according to this hypothesis, the sexual cycle of the mink under natural photoperiodic conditions is also explained by seasonal gonadotropic stimulation beginning after the autumn equinox when in our latitudes daily light duration is less than 12 hr. However, the end of the reproduction period which, in nature, seems to be the result of the inhibition of the gonadotropic function by long days could, in fact, be the result of a more complex mechanism. Different inhibiting mechanisms already shown in long-day animals could also be involved during this phase of the sexual cycle in the mink.

General and Comparative Endocrinology, 60, 109-115, 1985.

4 figs., 31 references.

Authors' summary.

REPRODUCTIVE CAPACITY IN MALE MINK AFTER LONG DISTANCE TRANSPORTATION IN PREGNANT FEMALES.

Christer Sundqvist, A. Lukola, M. Valtonen.

Young American male mink born in Finland from imported pregnant females showed a clear delay ($p < 0.05$) in testicular development as compared with local male mink in late February and produced semen of unsatisfactory quality during the breeding season in March. Better sperm quality ($p < 0.05$) and better testicular development ($p < 0.1-0.05$) was obtained in older American male mink born in Finland as compared with younger American male mink and the local breeding stock. Serum testosterone concentrations during six successive months in American males indicated a clear delay in sexual maturity and it could also be established that testosterone development reached normal levels in American males after 2 generations born in Finland. There were no differences in the serum thyroxine concentrations between American and local male mink.

Andrologia, 17, 6, 575-578, 1985.

1 table, 11 references.

In ENGL. Summary ENGL, GERM.

Authors' summary.

EFFECT OF 6-MBOA ON REPRODUCTIVE FUNCTION IN PONIES, MICE, RATS AND MINK.

O.J. Ginther, D.R. Bergfelt, S.T. Scraba, P.R. Pivonka, L.C. Nuti.

The effect on reproduction of the plant derivative 6-methoxybenzoxazolone (6-MBOA), which stimulates reproductive function in voles, was tested in pony mares, laboratory mice and rats, and mink. There was not a significant effect of intravenous injections of 6-MBOA on the ovarian follicles during the transition between the anovulatory and ovulatory seasons in mares. No significant effect of intraperitoneal injections of 6-MBOA on the weight of uterus or ovaries was found in eight-week-old mice, failing to confirm the results of an earlier report. In immature white rats, 6-MBOA treatment resulted in an increase in uterine weight ($P < 0.05$) at the lowest dose tested (0.03 $\mu\text{g}/\text{rat}$; mean for controls, 34 \pm 2 mg; treated, 47 \pm 5 mg). However, no significant effect was found on the weights of the ovaries and other glands or in coded scores for ovarian stimulation and uterine fluid distention. Adding 1.5 mg 6-MBOA to the daily feed ration of mink beginning two weeks before the mating season did not affect the mean number of kits born. Nulliparous female mink had smaller ($P < 0.001$) litter size than multiparous females. In addition, of the mink that whelped, there were more ($p < 0.01$) nulliparous females (25/118) than multiparous females (9/144) that lost one or more kits within 48 hours. These results, however, were not altered by 6-MBOA treatment.

Theriogenology, 24, 5, 587-595, 1985.

3 tables, 8 references.

Authors' summary.



THE INFLUENCE OF CHROMOSOMAL POLYMORPHISM ON FERTILITY IN FOX.

(Vplyv chromozomalneho polymorfizmu na plodnost polarnych lisok).

V. Parkányi, I. Jakubicka, J. Rafay.

A total of 80 blue foxes - 62 females and 18 males - were karyologically investigated for the purpose of monitoring the distribution of genotypes. The results show that all three chromosomal types were represented both in females and in males:

$2n = 50$ (42.5%), $2n = 49$ (38.75%) and $2n = 48$ (18.75%).

The size of litter at the birth was not markedly influenced by the chromosomal type. The most marked was the death rate of young up to the weaning time in genotypes with $2n = 50$ (cytogenetical homozygotes). The number of the animals born ($\bar{x} = 9.74$) was reduced down to $\bar{x} = 4.32$. Apart of that, liquidation of whole litters was recorded only in genotypes with $2n = 50$. The highest rate of survival was recorded in litters from females with $2n = 49$, i.e. cytogenetical heterozygotes ($\bar{x} = 7.21$) at the time of weaning.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 109-119.

5 tables.

Authors' summary.

In CZEC. Summary ENGL.

THE INFLUENCE OF CLIMATE CONDITIONS ON THE MATING TIME IN BLUE FOXES.

(Vliv klimatickych podminek na dobu páření polárních lišek).

F. Kukla.

Over 1983-85, the time of mating was observed in arctic foxes as affected by certain conditions of climate. The observations revealed that the abnormally low temperatures in 1985, during the months of January and February, did not exercise any substantial effect on the time of mating, just the contrary, for during the former half of March a higher percentage of the females had been mated than this was the case in previous years.

It is concluded from the observations that the light pattern - the length of sunshine - together with construction of the cage housing the animal had a more substantial effect on the mating in arctic foxes. In the cages with complete back walls installed or in partially shaded cages the females (observed being a group of one-year old animals) showed delayed oestrus and, because of the higher barrenness of the late-mated females, their fertility rates were lower as a result.

The breeding season of arctic foxes is affected, besides a number of other factors associated with climate, mainly by the intensity of light inside the cage.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 121-127.

In CZEC. Summary ENGL.

Author's summary.

REPRODUCTION IN SABLES IN RELATION TO THE TIME OF MATING,
OESTROUS CYCLE TRAITS, AND AGE.

ВОСПРОИЗВОДСТВО СОБОЛЕЙ В СВЯЗИ СО СРОКОМ СПАРИВАНИЯ,
ХАРАКТЕРОМ ПОЛОВОЙ ЦИКЛИЧНОСТИ И ВОЗРАСТОМ САМОК

M.G. Gel'bert.

Data from 3 successive annual breeding seasons were analysed. For 1200 adult (more than or equal to 3 years of age) and 267 young females (2 years), the percentage that mated at the 1st oestrus of the breeding season was 19.1 and 5.8 resp., during the first 5 days of the season (starting on 21 June), 37.2 and 15.7 during the second 5-day period, and 27.0 and 18.2 during the third 5-day period, 83% of adults had mated at 1st oestrus by 6 July, and a similar percentage of young females had done so by 16 July. Individual females showed a characteristic number of oestrous cycles during the breeding season. The CR declined as date of mating advanced. For single- and multiple-cycle adult females, it fell from 83.2 and 88.2 resp. in early July to 25 and 68.3 in late July; for single- and multiple-cycle young females, it fell from 55.6 and 60 to 11.1 and 35.1 during the same period. For adult females that showed 1, 2 and 3 cycles, CR averaged 82.0, 80.7 and 71.2% resp., corresponding percentages for young females were 34.6, 48.6 and 57.2.

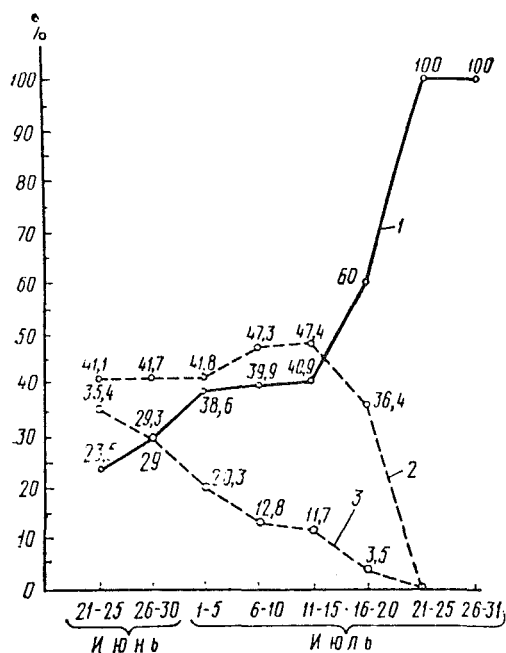


Рис. 1. Изменение относительного количества взрослых самок по срокам первого покрытия (в среднем за 3 года): 1 — одноцикловые; 2 — двухцикловые; 3 — трехцикловые самки.

Selskokhozyaistvennaya Biologiya, 7, 83-88, 1985.

4 figs., 1 table, 15 references.

CAB-abstract.

In RUSS. Summary ENGL.

IS THERE A CRITICAL WEIGHT FOR OESTRUS IN THE FERRET?

B.T. Donovan.

Information concerning the weight at the onset of a period of oestrus, the timing of oestrus, the age at first oestrus and the lighting conditions was collected from the records of 1364 ferrets and reviewed for evidence indicating that the animals became sexually mature around a particular, critical, weight. None was found, but the results suggest that there is at minimum weight, around 420 g, below which oestrus does not occur.

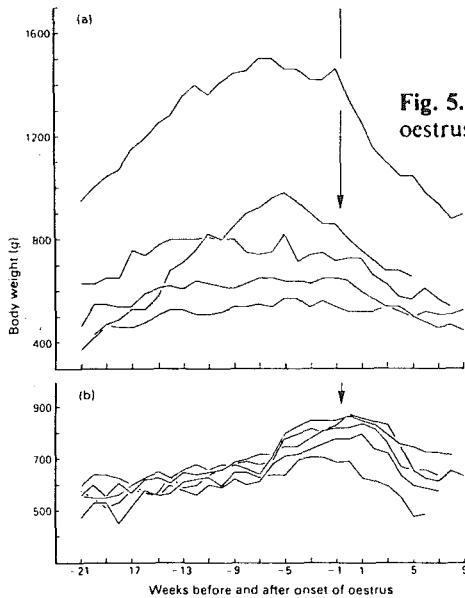


Fig. 5. The changes in body weight over the 21 weeks before and 10 weeks after the onset of oestrus in 5 animals exposed to short days (a) and 5 kept under long days (b).

J. *Reprod. Fert.*, 76, 491-497, 1986.
5 figs., 17 references.

Author's summary.

EMBRYONIC DEVELOPMENT AND RESORPTION IN FERAL NUTRIA (MYOCASTOR COYPUS) FROM MARYLAND.

J.A. Chapman, J.C. Lanning, G.R. Willner, D. Pursley.

Between June 1974 and March 1976, 77 pregnant female nutria (*Myocastor coypus*) were collected in Dorchester County, Maryland. The embryos, which were from 3 mm to full term in size, were weighed, measured, dehydrated and serial paraffin sections were made. Observations were made of development and resorption. Embryo development in the nutria was found to be similar to that of other mammals except that (1) the normal closure of the neural tube was completed much later, (2) the thin roof present on the metencephalon of other mammals was lacking, (3) the olfactory nerves developed earlier than normal in two embryos and (4) development of mesonephroi was complete much later than normal.

Mammalia, 44, 3, 371-379, 1980.
1 table, 3 figs., 10 references.
In ENGL. Summary In FREN.

Authors' summary.

HISTAMINE AND SECONDARY AUTOIMMUNE INFERTILITY IN DARK MINK (MUSTELA VISON).

B.R. Nemetallah, R.E. Howell, L.C. Ellis.

Testicular histamine content was higher in December (the time of sexual quiescence) than in March (breeding time) in opaline mink. Although testicular histamine synthesis increased in March over December, the increased cellular mass and increased histaminase activity prevented the biogenic amine from rising. Dark mink, however, had higher gonadal levels of histamine in March than in December owing to an increased rate of synthesis and a decreased rate of inactivation that correlated well with the onset of autoimmune infertility in this strain. Pastel mink were intermediate to the opalines, and dark mink indicative of strain differences in the genetic control of gonadal histamine synthesis and inactivation.

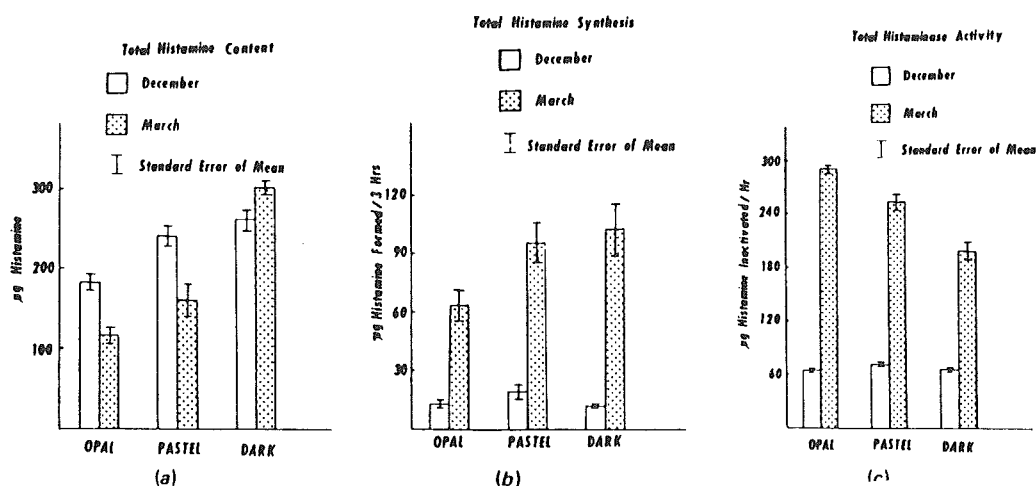


FIGURE 1. Testicular histamine content (a), testicular histamine synthesis (histidine decarboxylase activity) (b), and testicular histaminase activity (c) of opaline, pastel, and dark mink in December (the time of testicular quiescence) and March (the time of breeding) expressed as the average total content or total activity per animal (pair of testes).

Archives of Andrology, 15, 79-82, 1985.
1 fig., 16 references.

Authors' summary.

ANALYSIS OF REPRODUCTIVE TRAITS OF DIFFERENT TYPES IN FEMALES.

(Analiza reproduknych ukazovatelov roznych typov chovneho tchora (tchorofretky))

M. Bednarz.

The aim of this study was the comparison among three groups of breeding females polecat one year of age: Polish and Scottish h standards and the pastels from Hungary. All animals were kept in farm which was located in Central part of Poland. The difference in oestrus time between groups was not significant. The highest percent of parturiated females showed Scottish polecats - 93.6. The number of young polecats weaned in two standard groups was approximated, in pastel reduced one young on the average.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 163-168.

2 tables.

Author's summary.

In CZEC. Summary ENGL.

RESULTS OF INSEMINATIONS IN 1985.
(Resultat av semineringsverksamheten 1985).

Maija Valtonen, Kaj Lindh.

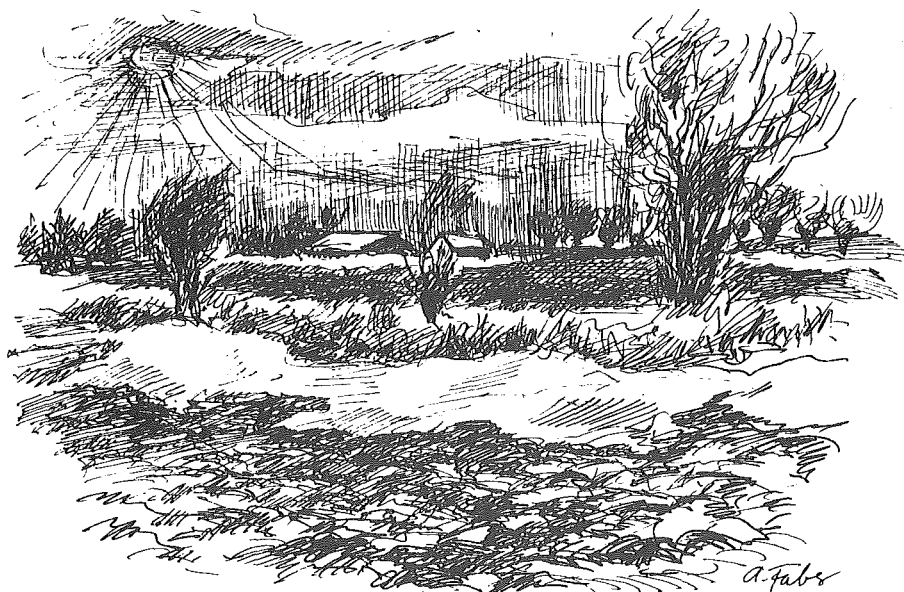
For 1096 blue fox females inseminated in Finland in 1985 with blue fox semen, the CR was 73.81%, the number of cubs born averaged 5.81 per inseminated female and 7.87 per female whelping vs. 71.55%, 4.89 and 6.83 resp. for 23,384 blue fox females inseminated with semen from silver, red or crossbred foxes. For 4154 silver fox females inseminated with semen from males of their own type, the CR was 63.41%, the number of cubs born averaged 2.37 per inseminated female and 3.73 per female whelping vs. 42.22%, 1.27 and 3.0 resp. for 334 silver fox females inseminated with semen from other types of fox. Of 25,255 females inseminated once, 7834 females inseminated twice, and 2514 females inseminated once and mated naturally once, 69.06, 71.78 and 91.19% resp. conceived; the percentage of cubs lost during pregnancy or immediately after parturition averaged 10.25, 6.59 and 3.26 in the 3 groups, the number of cubs born per inseminated female 4.29, 4.71 and 7.58, and the number born per female whelping 6.21, 6.56 and 8.10. Data are tabulated by district.

Finsk Pälstidskrift, 20, 1, 17-20, 1986.

7 tables, 2 figs.

In SWED.

CAB-abstract.



Effects of Feeding Manipulations on Serum Levels of Thyroid Hormones, Total Lipids and Urea in Growing Farmed Raccoon Dogs

Hannu Korhonen, Department of applied Zoology, University of Kuopio, POB 6 SF-70211 Kuopio 21 Finland.

Summary

Effects of feeding intensity and frequency on body weight gain, and serum levels thyroxine (T_4), triiodothyronine (T_3), total lipids and urea were studied in juvenile, growing raccoon dog (*Nyctereutes procyonoides*, Gray 1834). The results showed that these feeding manipulations did not markedly affect on the studied parameters of the animals. Only in animals of other groups. Thyroid hormone levels of the animals were not affected by the used feeding treatments but their levels tended to decrease with increasing age (and body weight). Live weight curves were normal and similar in each experimental group.

Introduction

Raccoon dogs (*Nyctereutes procyonoides*, Gray 1834) prepare themselves during autumn for winter by increasing their body weight, especially the amount of subcutaneous body fat (Korhonen et al., 1982; 1984; Korhonen and Harri, 1984; 1986). Although a tendency for fat storage can be regarded as a meaningful winter adaptation in nature, under farm conditions it easily leads to excessive fattening of the animals (Korhonen and Harri, 1985; Korhonen et al., 1984; 1986). Obese animals tend to have worn buttocks which means monetary losses for fur farmers (Finnish Fur Breeders' Association statistics, 1986).

It has been suggested that dilution of the energy density of the diet or fasting of the animals may prevent excessive autumn fattening. In our previous papers (Korhonen et al., 1982; 1984; Korhonen and Harri, 1986; Korhonen, 1986) these autumn fattening problematics have been studied;

we found that raccoon dogs do well on a two-days per week-fast, but do equally well if fed a double portion every other day, i.e. if animals are kept every other day without food. We, in addition, noticed that such feeding manipulations did not negatively affect body size, body composition, organ scaling or pelt quality of the animals. These observations allow us to conclude that dilution of energy density of the diet or fasting could be of practical use in preventing excessive obesity of raccoon dogs during autumn.

The aim of the present study was to evaluate to what extent dilution of feed, overfeeding or various fasting treatments affect certain biochemical characteristics of the serum blood in growing, juvenile raccoon dogs. Since it has been shown that thyroid hormone levels are attributable to nutritional influences but could also be involved on the control of basal metabolism and growth (Ryg and Jacobsen, 1982 a, b; Nilssen et al., 1982; Nieminen et al., 1984), serum thyroxine (T_4) and triiodothyronine (T_3) levels of the animals were monitored during the growing season. Furthermore, it was expected that fasting would lead to mobilization of body fats of proteins (c.f. Le Maho, 1983; 95; Penman et al., 1980). Thus serum levels of total lipids and urea were recorded. We were also eager to know to what extent these serum parameters could be reliably used as indicators of body fat and protein mobilization (Nieminen et al., 1984).

Materials and methods

Animals and diets

The experiments we carried out on the research farm of Kuopio University during the production

period of June-November in 1985. The total number of animals used was 72, and they were all housed in standard rearing cages (105 cm wide x 120 cm long x 60 cm high) in pairs. All animals were born in April-May. At the age of about 8 weeks they were weaned, sexed and identified by ear-marks.

The basal diet contained conventional ingredients such as slaughter-house offals, fish and cereals. It was composed according to the standards of the Finnish Fur Breeders' Association (Korhonen and Harri, 1985). Chemical composition of the experimental diets is given in Table 1. The animals were fed twice a day in June-August, and once a day for the remains. Water in summer and water/snow in winter were provided *ad libitum*. The animals were inspected daily, and they remained healthy during the course of the experiments.

Dilution of the diet was achieved by mixing low-energetic brewers' mash (OLVI Brewery, Iisalmi) into the basal diet. Meal frequencies were manipu-

Table 1. Chemical composition of basal and mash diets.

Ingredient	Basal diet	Mash
Dry matter (%)	32.2	28.9
In dry matter (%):		
Ash	7.4	6.6
Crude protein	37.7	33.3
Crude fat	24.8	23.5
Crude carbohydrates	30.1	36.6
ME (MJ/kg)	21.3	19.1
Protein % of ME	33.6	30.3
Fat % of ME	45.9	44.3
Carbohydrates % of ME	20.5	25.4

ME = Metabolizable energy

lated by fasting regimens. After weaning the following feeding groups were made: (1) basal feed with 25% (w/w) brewers' mash, fed *ad libitum* (A-MASH), (2) basal feed with 25% (w/w) brewers'

Table 2. Body weights and serum levels of total lipids, thyroxine, tri-iodothyronine and urea of experimental animals. Mean \pm SD is given for each parameter. (N = 5). Abbreviations of groups are given in materials and methods.

VARIABLE MEASURED	A-MASH	R-MASH	A-FAST	R-FAST	A-BASAL	R-BASAL	S
Total lipids, g/l							
10th Jul	6.3 \pm 1.4	5.4 \pm 0.3	5.5 \pm 0.8	5.4 \pm 0.6	5.9 \pm 0.8	4.9 \pm 0.7	NS
16th Sep	5.7 \pm 0.7	5.8 \pm 0.3	5.7 \pm 0.8	6.9 \pm 0.5	5.8 \pm 0.9	5.9 \pm 0.7	NS
18th Nov	4.6 \pm 0.7	5.1 \pm 0.7	4.5 \pm 0.4	6.4 \pm 0.3	4.7 \pm 0.6	4.8 \pm 0.3	**
S	NS	NS	NS	NS	NS	NS	
Thyroxine (T ₄), nmol/l							
10th Jul	35.8 \pm 4.4	34.8 \pm 7.5	34.7 \pm 6.9	30.4 \pm 8.7	36.7 \pm 4.4	32.2 \pm 3.5	NS
16th Sep	34.5 \pm 4.9	36.1 \pm 4.0	43.1 \pm 5.2	38.9 \pm 5.6	39.0 \pm 3.6	37.8 \pm 4.1	NS
18th Nov	22.7 \pm 5.4	23.5 \pm 4.4	26.8 \pm 5.2	26.2 \pm 9.9	21.0 \pm 3.3	24.5 \pm 7.2	NS
S	*	*	*	*	**	*	
Tri-iodothyronine (T ₃), nmol/l							
10th Jul	1.2 \pm 0.4	0.8 \pm 0.3	1.5 \pm 0.4	1.0 \pm 0.4	1.2 \pm 0.4	1.1 \pm 0.4	NS
16th Sep	1.3 \pm 0.4	1.3 \pm 0.4	1.5 \pm 0.3	1.2 \pm 0.4	1.1 \pm 0.5	1.2 \pm 0.4	NS
18th Nov	1.2 \pm 0.3	0.9 \pm 0.5	0.8 \pm 0.2	0.8 \pm 0.5	1.4 \pm 0.4	1.0 \pm 0.7	NS
S	NS	NS	*	NS	NS	NS	
Urea, mmol/l							
10th Jul	8.2 \pm 3.4	6.1 \pm 1.3	7.7 \pm 2.3	6.1 \pm 0.7	7.5 \pm 1.2	6.4 \pm 1.3	NS
16th Sep	5.7 \pm 1.6	5.9 \pm 0.9	5.6 \pm 1.0	10.4 \pm 1.2	5.4 \pm 1.6	6.1 \pm 2.4	***
18th Nov	6.3 \pm 0.9	6.6 \pm 1.1	4.7 \pm 0.8	7.8 \pm 0.5	4.7 \pm 0.5	6.0 \pm 1.3	**
S	NS	NS	NS	**	NS	NS	
Body weight, kg							
10th Jul	2.3 \pm 0.6	2.3 \pm 0.8	2.3 \pm 0.7	2.5 \pm 0.7	2.3 \pm 0.9	2.4 \pm 0.7	NS
16th Sep	5.8 \pm 1.9	5.7 \pm 0.9	5.6 \pm 0.9	6.5 \pm 1.0	6.4 \pm 0.9	6.4 \pm 1.0	NS
18th Nov	7.5 \pm 1.0	7.1 \pm 0.9	6.5 \pm 0.7	7.5 \pm 1.1	7.2 \pm 0.7	7.2 \pm 0.8	NS

Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, NS = not significant (analysis of variance)

mash, fed 600g per animal daily (R-MASH), (3) basal feed, fed *ad libitum*, fasted twice a week (Wednesday, Sunday) (A-FAST), (4) basal feed, fasted every other day, fed 1200 g per animal daily (R-FAST), (5) basal feed, fed *ad libitum* (A-BASAL), and (6) basal feed, fed 600 g per animal daily (R-BASAL). Each group consisted of 6 males and 6 females. The experiments lasted from July to November. For a complete description of the experiment see Korhonen (1986).

Biochemical assays

The blood samples were taken from the saphenous vein of the right front foot. For the times blood samples were collected, see Table 2. The blood was allowed to clot, centrifuged, and the serum divided into several aliquots and kept frozen until assayed. Blood samples were taken every sampling day Wednesdays at the same time (10.00-11.00 o'clock).

Total serum lipid concentrations were determined by the sulfophospho-vanillin reaction (Zöllner and Kirch, 1962). Serum thyroxine and triiodothyronine concentrations were determined by radio immunoassay (RIA) test kits (Farnos Oy, Turku, Finland) and urea by the enzymatic colorimetric test (Boehringer Mannheim, test combination, West Germany) (c.f. Aakvarg et al., 1978 Haug et al., 1977). Assays were performed in duplicate for all samples, and assays for samples collected at different times were simultaneously.

Statistical treatments

Statistical analyses were computed by analysis of variance combined with Student's *t*-test. Since no sex differences were found, the data of males and females were pooled. Data were processed by the VAX 11/780 computer and SPSS (Statistical Package for Social Sciences) program.

Results

At the beginning of the experiments there were no statistical differences in the blood serum parameters studied between the feeding groups. Furthermore, feeding arrangements used did not markedly affect on these. On the 18th of November serum total lipids in R-FAST animals were significantly higher ($p < 0.05$) than in animals of other feeding groups. Thyroid hormone levels were not significantly influenced by diets or feeding frequencies. However, seasonal changes in serum concentrations of thyroxine were observed in each group; values were highest in young animals and gradually decreased with increasing age (and body weight).

No marked seasonal changes in tri-iodothyronine, total lipid or urea levels were observed.

Live weight curves of growing, juvenile raccoon dogs were normal and similar in each experimental group. Only the animals fasted twice a week but other days fed *ad libitum* showed a tendency for ceased weight gain from mid-September onwards. However, their final body weight did not differ significantly from the other groups.

Discussion

The results showed that changes in feeding frequency or intensity did not cause any visible effects on thyroid hormone levels. Whether hormone activities in young, growing animals are sensitive to nutritional influences, or the feeding arrangements were intense enough to provide such influences, cannot be deduced from the present observations.

It has been found that thyroid hormone levels of mammals can be influenced by altering their feed intake levels. Known examples of thyroid hormone level susceptibility to nutritional influence are increased food intake but decreased weight gain in the reindeer after thyroid hormone treatment (Ryg and Jacobsen, 1982 b), changes in T_3 levels following alterations in food consumption in the reindeer (Ryg and Jacobsen, 1982 a), and increased T_4 to T_3 ratio in human overeating and obesity (Danforth and Burger, 1981). In addition, our recent paper (Korhonen, 1986) showed that in adult raccoon dogs changes in the amount of feed intake produced parallel changes in thyroid hormone activities, and that thyroid hormone activities in overfed raccoon dogs were significantly higher than those of fasted ones.

Thyroid hormone levels of growing animals were significantly higher than described previously for adult animals (Korhonen, 1986). Thus one would expect that basal metabolism of juveniles is also higher. This actually holds true; oxygen uptake measurements have shown (Korhonen and Harri, 1984) that resting metabolic rate (RMR) of young raccoon dogs is significantly higher than that of adults and that metabolism of whelps gradually decreases when the animals are growing (Korhonen et al., 1984). This trend was evident from the present data also.

Glucose is normally the only source of energy in tissue metabolism. However, a progressive shift from a reliance on carbohydrate reserves to mobilization of fat occurs in fasting conditions, and after depletion of fat reserves, body tissue reserves are used as an energy source. Use of proteins as an

energy source could be reflected in the blood serum profile of the animal, and result in an increased serum concentration of urea (Bruune and De Koster, 1983; Macari and Baraldi, 1983; Menahan and Sobocinski, 1983; Le Maho, 1983). On the other hand, protein-deficient Arctic foxes exhibit a marked decrease in serum urea nitrogen which makes it useful in ascertaining the health of these animals (Pennan et al., 1980).

In animals fed every-other-day-fast serum concentrations of urea were significantly higher than in animals of other groups. Total serum lipid levels were increased in this group supporting the conclusion that fasted animals may, to some extent, mobilize their body energy reserves. On the other hand, the data from the adult raccoon dogs (Korhonen, 1986) demonstrates that neither serum urea nor total lipid levels are accurate indicators of mobilization of body fat or protein stores. This means that some other parameters must be sought to confirm the mobilization. It seems from the present data, that this not necessarily holds true for juvenile, growing raccoon dogs.

Acknowledgements

Warm thanks are due to Ms. Riitta Tirkkonen for her valuable assistance in the laboratory. Thanks are also due to Mr. Urpo Kröger, Mr. Mikko Ikäheimo and Mr. Harri Toivanen for their practical help on the farm. Financial support for this investigation was provided by the Finnish Research Council for Natural Sciences, the Alfred Kordelin Foundation, the Finnish Cultural Foundation and the OLVI Foundation.

References

- Aakvaag, A., Sand, T., Opstad, P. K. and Fonnum, F. (1978): Hormonal changes in serum in young men during prolonged physical strain. *Eur. J. Appl. Physiol.* 39: 283-291.
- Bruune, J. J. and De Koster, P. (1983): Glycogenolysis in the fasting dog. *Comp. Biochem. Physiol.* 75 B: 553-555.
- Danforth, E. Jr. and Burger, A. G. (1981): Hormonal control of thermogenesis. In *The Body Weight Regulatory System: Normal and Distributed Mechanisms*. (Edited by Cioffi, L. A., James, W. P. T. and Van Italie, T. B.). Raven Press, New York.
- Finnish Fur Breeders' Association. Statistics 1986.
- Haug, E., Frey, H. M. M. and Sand, T. (1977): The thyrotrophin response to thyrotropin releasing hormone during treatment in patients with Graves' disease. *Acta Endocrinol.* (Copenhagen). 85: 335-343.
- Korhonen, H., Harri, M. and Asikainen, J. (1982): Effect of various diets and energy levels on the growth of farmed raccoon dogs. *Savonia* 5: 1-9.
- Korhonen, H., Harri, M. and Asikainen, J. (1984): Energy requirements of growing, farmraised raccoon dogs. *Acta Zool. Fennica* 171: 195-196.
- Korhonen, H. and Harri, M. (1984): Seasonal changes in thermoregulation of the raccoon dog (*Nyctereutes procyonoides* Gray 1834). *Comp. Biochem. Physiol.* 77 A: 213-219.
- Korhonen, H. and Harri, M. (1985): Growth and fur parameter variations of farmed raccoon dogs. *Arch. Tierernährung* 35: 761-772.
- Korhonen, H. and Harri, M. (1986): Effects of feeding frequency and intensity on growth, body composition, organ scaling and fur quality of farmed raccoon dogs. *Acta Agric. Scand.* (in press).
- Korhonen, H. (1986): Seasonal changes in feed intake, body energy reserves and thyroid hormones in farm-raised raccoon dogs. *Can. J. Zool.* (submitted for publication).
- Le Maho, Y. (1983). Metabolic adaptations to long-term fasting in antarctic penguins and domestic geese. *J. Therm. Biol.* 8: 91-96.
- Le Maho, Y. (1985): Metabolic adaptations to long-term fasting during breeding cycle in emperor and king penguins. In *Endocrine regulations as Adaptive Mechanisms to the Environment. 1-5.7. 1985. Villiers-en-bois. F. 79360. Niort, France. Abstract book. p. 27.*
- Macari, M. and Baraldi, S. M. (1983): Effects of fasting, noradrenaline and glucose tolerance test on free fatty acids and blood glucose in thyroiddeficient pigs. *Comp. Biochem. Physiol.* 74 B: 743-747.
- Menahan, L.A. and Sobocinski, K.A. (1983): Comparison of carbohydrate and lipid metabolism in mice and rats during fasting. *Comp. Biochem. Physiol.* 74 B: 859-864.
- Nieminen, M., Ojutkangas, V., Timisjärvi, J. and Hissa, R. (1984): Serum lipids, thyroxine and catecholamine levels in the reindeer with reference to the annual climatic cycle. *Comp. Biochem. Physiol.* 79 A: 87-92.
- Nilssen, K. J., Sundsfjord, J. A. and Blix, A. S. (1982): Energy expenditure and thyroidal activity in captive Norwegian reindeer, (*Rangifer tarandus tarandus*). In *3rd Int. Theriol. Congr. 15.-20.8. 1982. Helsinki, Finland. Abstract book. p. 297.*

- Penman, J. A., Garrott, R. A., Anthony, A., Eberhardt, L. E., Tothenbacher, H., Storm, G. L. and Tzilkowski, W. M. (1980): Bioindicators of the health of Arctic foxes. In *First Worldwide Furbearer Conference, 3.-11.8. 1980. Frostburg, Maryland, USA. Vol. I. (Edited by Chapman, J. A. and Pursley, D.). pp.386-406.*
- Ryg, M. and Jacobsen, E. (1982 a): Seasonal changes in growth rate, feed intake, growth hormone, and thyroid hormones in young male reindeer (*Rangifer tarandus tarandus*). *Can. J. Zool.* 60: 15-23.
- Ryg, M. and Jacobsen, E. (1982 b): effects of thyroid hormones and prolaktin on food intake and weight changes in young male reindeer (*Rangifer tarandus tarandus*). *Can. J. Zool.* 60: 1562-1567.
- Zölnerr, N. and Kirch, K. (1962): Über die quantitative Bestimmung von Lipoiden (Mikromethode) mittels der vielen natürlichen Lipoiden (allen bekannten Plasmalipoiden) gemeinsamen Sulfophosovanillin-Reaktion. *Z. ges. exp. Med.* 135: 545.

SCIENTIFUR, VOL. 11, No. 1, 1987



DIGESTIBILITY OF NITROGEN AND AMINO ACIDS OF SOME DRY FEEDSTUFFS FOR MINK.

Tuomo Kiiskinen, Lea Huida, Barbara Pastuszewska, Hans Berg.

The apparent (ADN) and true (TDN) digestibilities of total nitrogen and amino acids (ADAA, TDAA) were studied in herring meal, meat meal, poultry by-product meal (PBM), soybean meal, potato protein (Protamyl), wheat gluten (WG) and Pekilo single cell product using black male minks and the difference method of total excreta collection. Metabolic faecal nitrogen and amino acids were determined by feeding a proteinfree diet to one group.

ADN and TDN of the protein sources in the above mentioned order were: 73.9, 79.7, 77.9, 83.5, 50.4, 55.1, 78.6, 84.5, 80.9, 86.9, 89.3, 96.0, 78.1, 83.4%, respectively. The values of PBM and WG differed significantly ($P < 0.05$) from the others. TDN was an average of 5.7 percentage units higher than ADN.

In general the mean digestibility of the individual amino acids was clearly higher than the corresponding N digestibility. The average ADAA ranged from 67 (PBM) to 90% (Pekilo) and TDAA from 73 (PBM) to 97% (WG). Significant differences in the values of individual amino acids were found between the protein sources. The internal variation of the values among the individual amino acids was great especially in PBM, in which TDAA ranged from 44 (histidine) to 93% (threonine). It can be concluded that the digestibility determinations of amino acids are reasonable and useful.

Ann. Agric. Fenniae, 24, 107-114, 1985.

7 tables, 20 references.

Authors' summary.

In ENGL. Summary FINN.

LOW-PROTEIN FEEDING IN MINK: EFFECTS OF PLASMA FREE AMINO ACIDS, CLINICAL BLOOD PARAMETERS, AND FUR QUALITY.

Jouko Työppönen, Maija Valtonen, Hans Berg.

Four groups of mink were fed from weaning to pelting with feed of different protein levels. The metabolizable energy (ME) from protein amounted to 40/36% in the control group and 36/31, 31/27, and 27/23% in the medium, medium-low, and low-protein groups during the early and late growth period, respectively. Weight gain and hematological parameters were within normal range in all groups, but the lowest values were observed in the lowest dietary protein groups. There were no significant differences in plasma urea or creatinine concentrations between the groups. Plasma albumin and total protein increased with age and were highest in the low-protein group. The activities of transaminases, ASAT and ALAT, in plasma were also highest in the low-protein groups. The plasma content of total free amino acids was higher in the low-protein group as compared to the controls, especially essential amino acids. These changes as well as the individual plasma amino acid concentrations indicated a metabolic response to conserve nitrogen and amino acids in mink on low-protein diet. Plasma free amino acid concentrations can hardly be used as diagnostic means but their ratios may be a useful aid in determination of protein and amino acid requirements in mink. Fur size and colour were not affected

by low-protein feeding, but the quality of fur was lowered in mink fed with the low-protein diet.

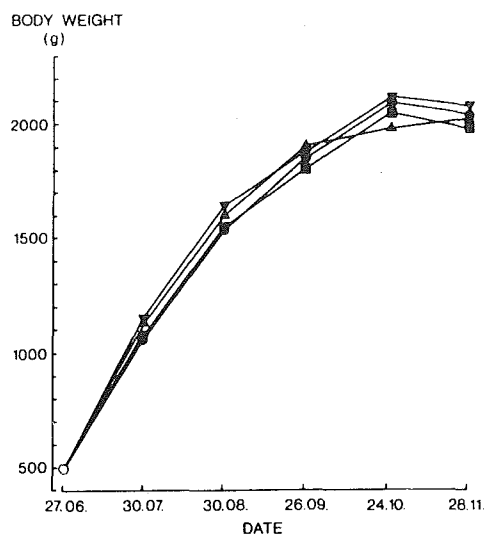


Fig. 1. Weight gain of male mink fed with different doses of protein in the feed: (●) control; (▲) medium; (▼) medium-low; (■) low. Results represent mean weight of 48 minks in the control group and 32 minks in the other groups.

Acta Agric. Scand. 36, 421-428, 1986.
7 tables, 1 fig., 28 references.

Authors summary.

TRIALS WITH CHANGES OF FEED AT DIFFERENT TIMES DURING PREGNANCY. (Forsøg med foderskift på forskellige tidspunkter i drægtighedsperioden).

R. Sandø Lund.

Mink were fed on fish waste with industrial fish, blood, protein and vitamin mixtures, barley, lard and soya oil, with protein, fat and carbohydrate supplying 55, 31 and 14% of energy. Change from winter diet to lactation diet by adding 0.6% each of lard and soya oil, to give energy proportions of 50, 37.5 and 12.5, was made on 1 April or 18 April or on 5 May. The trial ended on 15 June. The earlier the dietary change, the lower were mortality rates for young on days 1 to 2 and in the following 2 weeks. Suckling ability of female mink was poorer with dietary change on 18 April than on the other dates. Reduction of protein intake in January or February was not advised.

Dansk Pelsdyravl, 48, 2, 129, 131. 1985.
4 tables.
In DANH.

CAB-abstract.

RESTRICTED FEEDING AND USE OF INDUSTRIAL FISH. (Om restriktiv fodring og brug af industrifisk).

Georg Hillemann.

Four groups of 280 young mink, half each standard and pastel, male and female, had from summer a control feed or 30% industrial fish, consisting of sandeels and sprats, as silage and frozen, in a ration supplied to appetite or with intake restricted to 93% of control till 1 September or till pelting. Appetite, growth, behaviour and faeces were satisfactory. Use of industrial fish improved pelt characteristics and reduced feeding cost. Pelt size and price per pelt were most with industrial fish in feed suppli-

ed to appetite, whereas restricted feeding has an adverse effect, especially in pastel mink.

Dansk Pelsdyravl, 47, 7, 393-395, 1984.

4 tables.

In DANH.

CAB-abstract.

EFFECTS OF FEEDING FREQUENCY AND INTENSITY ON GROWTH, BODY COMPOSITION, ORGAN SCALING AND FUR QUALITY OF FARMED RACCOON DOGS.

Hannu Korhonen, Mikko Harri.

Effects of dietary dilution, plane of energy intake and meal frequency on growth, body composition, organ sizes and fur quality parameters were studied on farmed raccoon dogs (*Nyctereutes procyonoides* Gray 1834) during the growing period (July-November). Meal frequencies were manipulated by two fasting arrangements: (1) animals without feed twice a week (Wednesday and Sunday), but other days fed ad libitum, (2) two-day ration offered every other day. Feed dilution was achieved by mixing low-energetic brewers' mash (25% w/w) with basal feed. Both the diluted and the basal diets were offered as restricted or ad libitum portions. Live weight curves of the experimental groups were similar ($p > 0.05$).

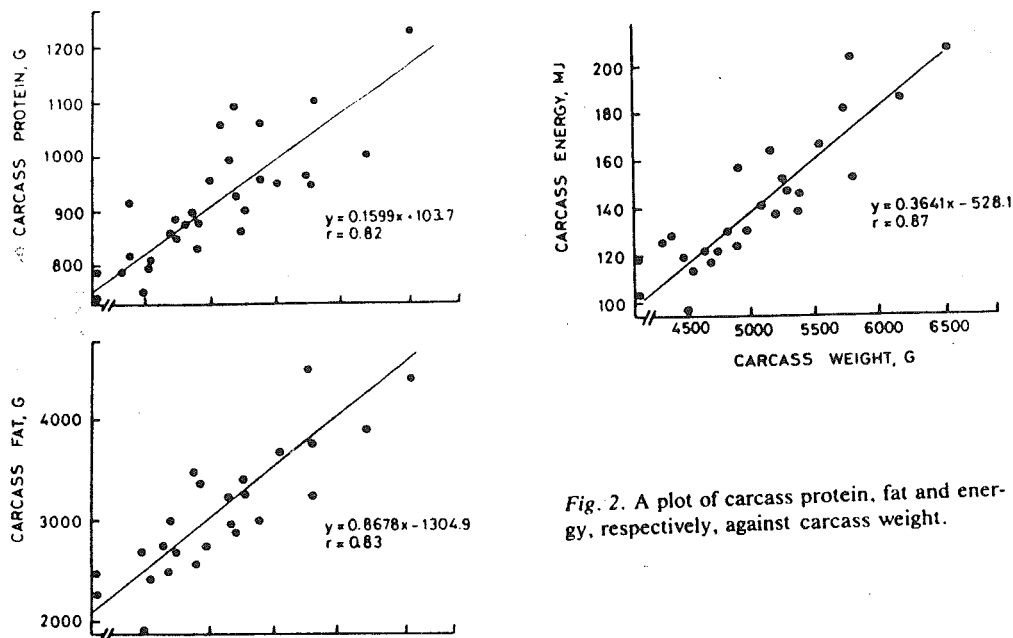


Fig. 2. A plot of carcass protein, fat and energy, respectively, against carcass weight.

Energetic efficiency of the animals was clearly better on mash than on basal diet. Daily feed spilage was highest in mash groups whereas feed remains in these groups were the lowest. No significant differences in the carcass content of ash, lean or fatty tissues between different feeding groups were found. With increasing age (and body weight) the amounts of carcass ash, protein, fat and energy increased. In adult animals, there were a positive correlation between carcass weight and carcass energy ($r=0.87$), fat ($r=0.83$) and protein ($r=0.82$). In general, no marked differences in fur quality parameters between different groups were found - the only exception being animals fasted twice a week whose mass and quality of fur was poorer ($p < 0.05$) than that in other groups. The quality of fur was better in animals of longer and heavier pelts, i.e. in animals of big body size. The weights of vixceral organs in various feeding groups did not differ significantly from each other. This supports earlier

findings that no reliable conclusions can be drawn regarding the previous dietary history of the animals from their organ sizes. It is concluded that raccoon dogs naturally are accustomed to utilize effectively the energy of meals irrespective of their frequencies. Thus, restricted feeding in an attempt to avoid excessive fattening probably results in a simultaneous restriction in protein accumulation, and in a smaller pelt size.

Acta Agric. Scand. 36, 410-420, 1986.

6 tables, 2 figs., 29 references.

Authors summary.

THE NUTRITION OF FUR ANIMALS.

(Vyziva kozesinovyh zvirat v CSR).

J. Mouka.

According to a registration, there were 21,107 minks, 1,902 silver foxes and 6,050 blue foxes kept on the farms of the Czech Socialist Republic (organized breeders and socialist farms) on January 1st, 1986. The base of calculation was the guideline of the Ministry of Agriculture and Nutrition of the Czech Socialist Republic that sets 365 days per breeding animal and 180 feeding days for a young animal.

A daily ration of 0.2 kg is set for a mink and 0.5 kg for a fox. The estimated average is 3.5 young minks, 4 silver foxes and 7 young blue foxes.

The following products are produced in CSR: meat mixture VETAMIX, meat conserves for dogs VETACAN, supplementary mixture VETANOR and cereal mixture VETAMINK.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 39-43.

1 table.

Author's summary.

In CZEC. Summary ENGL.

RECENT ADVANCES IN FEEDING FERRETS.

(Vyziva chovnych tchorov vo svetle doterajsieho stavu vedy).

Boguslaw Barabasz.

This study presents the status of a hitherto-conducted investigations on ferret feeding under farm conditions. Nutrition of this species, belonging to the carnivorous fur bearers, is the main factor determining the quality of the produced pelts and production indices.

Up to the present it has been based on feed rations considering feed requirements of mink, and it supposedly slightly exceeds the actual needs. Studies on ferrets carried out by some countries are rather scarce. So far priority has been given in this field to the United States, Great Britain and the Soviet Union. Complex studies, which are expected to result in establishing feed rations for ferrets, have been also started in Poland.

Proceedings from: Prospects of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986, 185-189.

3 tables.

Author's summary.

In CZEC. Summary ENGL.

FITCH DIETS IN NEW ZEALAND: AN ANALYTICAL SURVEY.

C.G. Rammell, H.V. Brooks, G.R. Bentley, G.P. Savage.

Fitch diets from 30 farms were surveyed and analysed for moisture, protein, carbohydrate, fibre, ash, fat and individual fatty acids, fat peroxide value, and α -tocopherol. The dietary raw materials most often used were mutton, fish, poultry, beef and cereals. Eight of the 30 breeders added no vitamin or other supplements. Analytical mean (range) values on a wet matter basis were: moisture, 66.3 (49.6-76.8)%; protein, 16.5 (12.4-21.2)%; carbohydrate, 2.5 (< 0.1-8.7)%; fibre, 0.4 (0.1-1.0)%; ash, 3.7 (1.2-8.3)%; fat, 10.6 (1.4-26.1)%; peroxide value, 5.7 (0.3-110)m.equiv/kg fat; α -tocopherol, 13 (0.6-103)mg/kg; calculated gross energy value, 7.2 (3.7-13.7)MJ/kg. Protein contributed 42 (20-79)% of the gross energy value, fat, 49 (15-74)%, and carbohydrate, 6 (0-20)%. Polyunsaturated fatty acids (PUFA's) comprised 10 (3.6-39)% of the total fatty acids. The ratio of α -tocopherol to PUFA was 2.1 (0.1-10.5)mg/g. Results of the survey are discussed in the light of nutrient requirements for the fitch.

N.Z. Vet. J. 33, 207-209, 1985.
2 tables, 20 references.

Authors' abstract.

FORMULATION OF DIETS FOR YOUNG POLECATS.

К обоснованию рационов для молодняка хорьков

G.S. Taranov, I.V. Babunova.

Young polecats were in 5 groups of 80 each. Group 1, the control, was given a basal diet containing 4.2 g carbohydrates, supplying 19.4% of total metabolizable energy (ME), from grains. The ration for groups 2 and 3 contained 8.2 g carbohydrates providing 40% of total ME, and that for groups 4 and 5, 12.2 g and 60%. The feed mixture for groups 2 and 4 contained extruded grains and that for groups 3 and 5 rolled and boiled grains, respectively. The basal diet was of Korean cod, ox head, krill, fish meal, protein and vitamin concentrates and wheat. Throughout the rearing period average daily energy intake was 307, 293, 283, 273 and 265 kcal/head. Bodyweight at the end of rearing was 1708.5, 1674.7, 1662.0, 1538.0 and 1533.3 g. Number of pelts was 36, 40, 39, 40 and 40. Percentage of defective pelts was 38.9, 27.5, 28.2, 30.0 and 17.5 and of large pelts 83.3, 72.5, 71.8, 32.5 and 30.0. Quality score was 90.5, 87.4, 88.1, 68.4 and 68.3%.

Krolikovodstvo i Zverovodstvo, 1, 11, 1985.
2 tables.
In RUSS.

CAB-abstract.

WATER INTAKE OF YOUNG MINK.

О потреблении воды молодняком

N.A. Balakirev, V.M. Sazanov.

Mink were caged in pairs and separated into 3 groups. The 1st was fed in the mornings, the 2nd in the afternoons and the 3rd twice daily. In the diet meat products provided 20 to 25% of energy intake, fish 25 to 35, plant feeds 20 to 36, free fats 10 to 15 and other, not specified, 5%.

The digestible protein in the diet was 8.5 g/100 kcal and moisture content 65 to 75%. Water was provided at 0800, 1200 and 1700 h. During 3 months, groups 1, 2 and 3 respectively, took daily, on average 281, 328 and 313 kcal energy and 127, 102 and 92 ml water. Water intake was greatest from 0800 to 1100 h and from 1400 to 1700, i.e. shortly after eating. Final body weight of females was greatest, 2250 g, in group 2 and followed by group 3, 2150 g. Pelt quality was highest in group 2, followed closely by groups 3 and 1.

Krolikovodstvo i Zverovodstvo, 3, 5, 1985.
In RUSS.

CAB-abstract.

**DISTRIBUTION OF THIAMIN IN MINK.
Распределение тиамина
в организме норок**

V.A. Berestov, G.G. Petrova, S.P. Izotova.

From July to November, the 1st group of mink was given a diet containing 7 to 15% non-edible, thiaminase-containing fish, and also daily by vein 0.18 to 3.0 mg thiamin. In November, the diet was supplemented with thiamin. The 2nd group received from July to October 11 to 35.4% fish and from November, 41% plus thiamin 0,64 mg/head. Group 3 was given the same fish diet as the others and also by vein thiamin 120 mg/head. Concentration of thiamin (mg/100 g) was 0.140, 0.087 and 0.124 in the liver; 0.146, 0.068 and 0.197 in kidneys; 0.305, 0.105 and 0.302 in heart; 0.161, 0.108 and 0.179 in the brain; 0.158, 0.042 and 0.081 in muscle; 0.126, 0.049 and 0.074 in lung; 0.122, 0.132 and 0.099 in spleen; 0.079, 0.057 and 0.136 in stomach, and 0.051, 0.080 and 0.066 in the intestine.

Krolikovodstvo i Zverovodstvo, 5, 13-14, 1985.

1 table.

CAB-abstract.

In RUSS.

**TRIALS WITH DANISH POTATO PROTEIN FOR MINK.
(Forsøg med dansk kartoffelprotein til mink).**

Georg Hillemann.

From 12 July till pelting 2 groups of 280 young mink, standard and pastel, male and female, had freely feed with or without 4% potato protein, corresponding to about 20% total protein. Both mixtures were equal in energy and main nutrients. Potato protein was well accepted and tolerated and weight gain was satisfactory. Assessment of pelt characteristics of male mink showed an increase in fur thickness and slight deterioration in pelt surface with potato protein. Feed intake was about 10% less, feed conversion more efficient and cost of mixture less with potato protein, so pelt production was more economical than in the control group.

Dansk Pelsdyravl, 47, 12, 695, 697, 1984.

5 tables.

CAB-abstract.

In DANH.

VITAMIN TREATMENT OF PREGNANT BLUE FOXES DOES NOT PRODUCE MORE CUBS.

(Vitamin-behandling af drægtige blårase giver ikke flere hvalpe).

Vilhelm Weiss.

Two groups of about 285 female foxes, mated or inseminated, were given no vitamin supplement or received vitamin B and E by subcutaneous injection 7 to 14 days before expected birth date. Mean duration of pregnancy was 52.9 days for both. Mean litter size was 8.3 and 9.1 at birth and 7.9 and 8.6 at weaning. Sterility rates were 12.8 and 16.3%. Differences, if any, were not definitely ascribed to treatment.

Dansk Pelsdyravl, 48, 4, 271, 1985.

1 table.

CAB-abstract.

In DANH.

FEED VALUE OF EPRIN FOR MINK.

Кормовые свойства эприна

D.N. Pereldik.

Diets for groups 1 and 2 young adult female mink contained (g/100 kcal metabolizable energy (ME)) soft tissue wastes from cattle 24.0 and 19.2, feeds from cattle bones 13.0 and 10.4, freshly frozen fish 25.0 and 20.0, fish meal 3.0 and 2.4, extruded barley 8.0 and 8.0, Paprin (from yeast) 2.0 and 2.0, Eprin 0.0 and 4.8, heated fat 0.33 and 0.99. Each mink received daily a polyvitamin preparation 1 g, and every other day 20 mg of an iron preparation, Ferroanemin. Group 1 and 2 feed mixtures contained digestible protein at 10.3 and 10.9 g/100 kcal, digestible fat 4.0 and 3.7, and digestible carbohydrates 4.1 and 3.9 g/100 kcal ME. Litter size at whelping was 6.2 and 6.4, and 10 days after 5.2 and 5.6. In another experiment mink were fed on a basal diet or that diet with 23.5% of the digestible protein replaced by Eprin. Bodyweight at the end of feeding was 1.89 and 1.98 kg, area of pelt was 918 and 958 cm², percentage of very large-sized grade A pelts was 15.6 and 31.8, and of grade B pelts 40.6 and 36.4. The first-limiting amino acids in Eprin and Paprin were arginine and methionine-plus-cystine. Eprin was from yeast grown in ethyl alcohol.

Krolikovodstvo i Zverovodstvo, 5, 12-13, 1985.

4 tables.

CAB-abstract.

In RUSS.

USE OF PELLETS CONTAINING DIFFERENT AMOUNTS OF GRASS MEAL FOR FEEDING OF NUTRIA. MYOCASTOR COYPU.

Использование гранул

с разным содержанием травяной муки

V.F. Kladovshchikov, L.S. Verevkina.

For 26 days, 6 of which were for collection, the first group of coypu nutria was fed on a pelleted mixture containing clover-grass meal 10, barley and wheat grain 73.8, wheat bran 5, sunflower oilmeal 5, fish meal 1.2, protein and vitamin concentrate 2.0, bone meal and CaCO₃ 2.0, NaCl 0.5 and premix 0.5%. Each 100 g of the mixture contained 16% crude protein and 7.2% crude fibre. The second group was fed on a pelleted feed mixture high in grass meal and fibre, and containing, per 100 g, grass

meal 35, barley and wheat 40.1, bran 11, sunflower oilmeal 9.1, fish meal 2.5, protein-and-vitamin concentrate 1.3, NaCl 0.3, and premix 0.7 g; it contained 16.5% crude protein and 11.5% crude fibre. For the 2 groups, the number of females mated was 36 and 34. Percentage fertility after 2 months was 66.6 and 58.8, and of these whelping percentage was 83.3 and 85.0. Litter size was 5.9 and 5.8 (at whelping). Survival to weaning was 94.7 and 93.3%.

Krolikovodstvo i Zverovodstvo, 4, 19, 1985.
2 tables.
In RUSS.

CAB-abstract.

TOXICITY OF 3, 4, 5, 3', 4', 5'-HEXACHLOROBIPHENYL TO MINK.

R.J. Aulerich, S.J. Bursian, M.G. Evans, J.R. Hochstein, K.A. Koudele, B.A. Olson, A.C. Napolitano.

Diets supplemented with 0.01 or 0.05 ppm (mg/kg) of 3,4,5, 3', 4', 5'-hexachlorobiphenyl (345-HCB) were fed to mink to investigate the toxicological manifestations of this toxic polychlorinated biphenyl congener in a sensitive species. Dietary exposure of mink to 0.05 ppm 3,4,5, 3', 4', 5'-hexachlorobiphenyl for 135 days resulted in 50% mortality while no deaths occurred on 0.01 ppm 345-HCB. Clinical signs of toxicity included anorexia, bloody stools, disrupted molting patterns, and thickened, elongated and deformed nails. Ascites and gastric ulcers were present in animals that died. Statistically significant increases in liver, kidney, and adrenal gland weights were found in the 345-HCB-treated mink. Decreases in total and free triiodothyronine concentrations were observed in mink fed the 345-HCB-treated diets and total thyroxine was decreased in the mink fed 0.05 ppm 345-HCB. No consistent histopathologic lesions were found in the thyroid or adrenal glands of the 345-HCB-treated mink, nor were there any statistically significant differences between the 345-HCB-treated and the control mink in serum epidermal growth factor levels, plasma 17β -estradiol and progesterone concentrations, hepatic aminopyrine



Fig. 3. Front feet from pair-fed control (upper row) and 0.05 ppm 345-HCB-treated (lower row) mink showing nail growth

N-demethylase, and benzo(α)pyrene hydroxylase activities, hypothalamic norepinephrine, dopamine, and serotonin concentrations or in the incorporation of (^3H) thymidine by concanavalin-A-stimulated lymphocytes.

Arch. Environ. Contam. Toxicol. 16, 53-60, 1987.

4 tables, 3 figs., 39 references.

Authors' abstract.

LC₅₀ TEST RESULTS IN POLYCHLORINATED BIPHENYL-FED MINK: AGE, SEASON, AND DIET COMPARISONS.

T.C. Hornshaw, J. Safronoff, R.K. Ringer, R.J. Aulerich.

The toxicity of a polychlorinated biphenyl (PCB) mixture (Aroclor^R 1254) to mink (*Mustela vison*) was evaluated through three dietary LC₅₀ tests. These tests were designed to assess the effects of age of the test animals, composition of the diet, and season and year on the results of 28-day dietary LC₅₀ tests. A dose-dependent weight loss was noted for animals in all tests and similar dietary LC₅₀s were calculated for all three trials, both at the end of the 28-day exposure period (83, 84 and 79 ppm) and after a 7 day withdrawal period (58, 47, and 49 ppm). Based on all test criteria, age dietary composition, season, and year had little effect on the outcome of the LC₅₀ tests. The withdrawal period was important in determining the toxicity of Aroclor 1254 and should be considering in assessing the toxicity of other slowacting, lipophilic compounds.

Arch. Environ. Contam. Toxicol. 15, 717-723, 1986.

8 tables, 13 references.

Authors' abstract.



Blood Selenium dependent Glutathione Peroxidase Activity related to Endometritis in Blue Fox (*Alopex lagopus*)

Mogens Jørgensen, Mosbjerg pr. Sindal, Denmark.

Per Henriksen, State Veterinary Serum Laboratory, Hangøvej 2, 8200 Aarhus, Denmark.

Asbjørn Brandt, National Institute of Animal Science, Dept. of Fur Animals, Roskildevej 48 H, 3400 Hillerød, Denmark.

Abstract

The significance of selenium in the patogenesis of endometritis was investigated using selenium dependent glutathione peroxidase as an indicator of selenium status in Blue fox vixens.

The trial was conducted, as a double blind field trial with parenteral sodium selenite and placebo, on Blue fox vixens after mating from different farms receiving different feed.

Selenium therapy neither reduced the incidence of metritis nor enhanced the general nor eliminated the post partum activity of selenium dependent glutathione peroxidase or had effect on reproduction data in Blue fox vixens fed conventional danish central feed kitchen diets.

There was a general statistical significant glutathione peroxidase activity difference between the two samples independent of all other sources of variance other than time.

The most appropriate source of this variation was the diet and/or the physiological status.

Introduction

Endometritis in Blue fox vixens is a prevailing disease problem in danish fox farms.

The symptoms are brownish vaginal expectorate 1-5 days after whelping, depressed appetite, agalactia and whelpicide (Henriksen et al. 1985).

On a farm with a high prevalence of metritis blood selenium dependent glutathione peroxidase activity was determined on the grounds of suspecting selenium deficiency as described in pigs (Jensen et al. 1979).

The results showed approximately 10% less enzyme activity in the affected foxes compared to normal vixens from a farm without cases (Henriksen 1984).

In order to determine the significance of selenium in the patogenesis of endometritis and measure the selenium status as selenium dependent glutathione peroxidase, a double blind field trial was conducted with parental sodium selenite and placebo on foxes after mating from different farms receiving different feed.

Materials and methods

A hundred and ten Blue fox vixens were randomly selected from and divided equally between 5 farms including a farm which previously had had cases of endometritis.

The farms received 3 different central feedkitchen produced feeds.

Two days after mating blood samples were taken by puncture of the cephalic vein.

The haematocrit was determined by centrifugation and the selenium dependent glutathione peroxidase activity assays were conducted with .25 mM hydrogen peroxide used as substrate, with a reduced glutathione concentration of 1.0 mM, pH 7.0, and NADPH concentrations of .3 mM. (Agergaard et al. 1983).

Subsequently the sampled foxes were divided into 2 lots by treating every second fox with 1 ml sodium selenite (0.3 mg/ml s.c.) and the other with 1 ml isotonic saline solution (s.c.). Approximately 2-3 weeks after whelping (67 days after first blood

Table 1. The mean haematocrit, blood selenium dependent glutathione peroxidase activity and their ratio per farm, lot (1 = treatment, 2 = placebo), feedkitchin (FC) and time of sampling (1 = 45d. before whelping, 2 = 22d. after whelping).

Variable			Haematocrit		Se-GSH-Px		GSH/HCT	
Time of sam.			1	2	1	2	1	2
Farm	Lot	FC						
1	1	1	59	52	1226	998	21.0	19.5
1	2	1	60	53	1180	1010	19.7	18.4
2	1	2	53	47	1548	1001	29.8	21.2
2	2	2	52	46	1577	969	30.7	21.1
3	1	2	53	51	1156	937	21.9	18.5
3	2	2	50	50	1260	1047	25.0	21.1
4	1	2	-	34	1242	925	-	30.0
4	2	2	-	37	1247	1030	-	28.5
5	1	3	51	50	1238	1042	32.1	20.0
5	2	3	52	47	1254	1056	24.4	23.4

sample), a second blood sample was taken and analyzed as the first.

A vaginal swab was taken from females with endometritis for bacteriological analysis and submitted a sensitivity test towards the most common antibiotics.

The results were submitted to an analysis of variance using the SAS computing program.

Results and discussion

The analysis of variance was performed on the haematocrit, blood selenium dependent glutathione peroxidase activity, selenium dependent glutathione peroxidase activity divided by the haematocrit as an expression of the activity corrected for blood volume.

No interactions between farms, lots and time of sampling were found.

There was no effect of the treatment on the haematocrit, blood selenium dependent glutathione peroxidase activity their ratio, number of vixens, empty vixens, cubs, cubs per vixen, total number of dead cubs in treatment groups and vixens with endometritis (Table 1 and 2).

The only farm which developed cases of endometritis was the one which had cases previously.

There was a general statistical significant glutathione peroxidase activity difference between the two samples independent of all other sources of variance other than time.

The most appropriate source of this variation was the diet and/or the physiological status.

Despite the treatment with sodium selenite, the question remains whether the effect was prevailing 67 days after treatment. If there is no other explanation to the glutathione activity decrease other than the selenium status, the effect of the treatment wore out.

Table 2. The total number of vixens, empty vixens, cubs, cubs per vixen, dead cubs and vixens with endometritis per farm and lot.

Farm		1	2	3	4	5	
Number of:	lot						
	vixens	1	10	14	10	11	11
		2	10	14	10	10	11
empty vixens	1	1	2	2	0	1	
	2	2	0	1	1	0	
cubs/vixen	1	5.6	8.7	8.5	11.2	5.7	
	2	4.7	10.5	8.4	9.8	8.6	
dead cubs (T)	1	9	12	0	0	15	
	2	12	0	0	0	0	
endometritis cases	1	0	7	0	0	0	
	2	0	14	0	0	0	

If still the only explanation of the decrease is due to a selenium depletion this must have been quite substantial and could be caused by enhanced requirements due to pregnancy and lactation, combined with a relative concentrated energy and fat rich diet. Especially sulphate, sulphur containing amino acids (Halverson 1960), protein (Underwood 1977) and polyunsaturated fat (Mutanen et al. 1984) has been shown to decrease the absorption of both in- and organic selenium compounds from the intestinal mucosa.

Normal values for selenium dependent glutathione peroxidase have not been determined for the Blue fox. So the initial values could in principle be elevated values in response to oxidant stress (Ganther et al. 1976).

But in view of the lack of variation the values should represent normal values for Blue fox vixens at the described physiological state.

Conclusion

Selenium therapy neither reduced the incidence of metritis nor enhanced the general nor eliminated the post partum activity of selenium dependent glutathione peroxidase or had effect on reproduction data in Blue fox vixens fed conventional danish central feed kitchen diets.

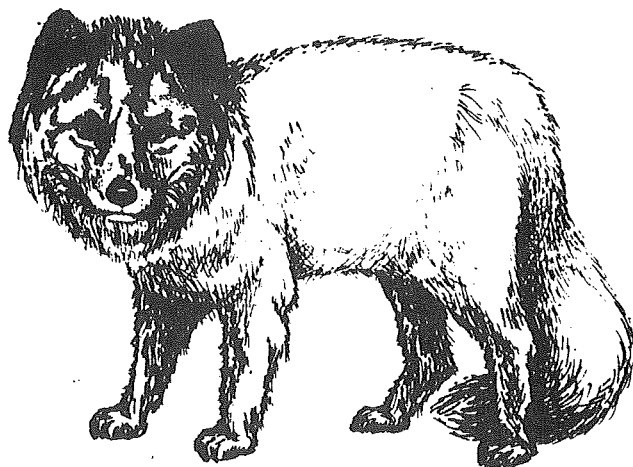
Acknowledgement

1. The pharmacy of the Royal Veterinary college is thanked for the preparation of both sodium selenite and placebo preparations.
2. P. T. Jensen at the State Veterinary Laboratory, Bülowsvej 27, 1870 Frederiksberg C, Denmark, for the analysis of haematocrit and selenium dependent glutathione peroxidase.
3. The five Blue fox farmers.
4. Danish Fur Breeders' Association for financial support.

References

- Agergaard, N. and Jensen, P. T. Procedure for Blood Glutathione Peroxidase Determination in Cattle and Swine. *Acta Vet. Scand.* Vol. 23, pp 515-527, 1982.
- Ganther, H. E., Hafeman, D. G., Lawrence, R. A., Serfass, R. E. and Hoekstra, W. G. 1976. Selenium and Glutathione Peroxidase in health and Disease (Prasad, A. S., Oberleas, D., eds.), vol. II, pp.165-234. Academic Press, New York.
- Halverson, A. W.: An effect of dietary sulfate on selenium poisoning in the rat. *J. Nutr.*, 1960, 70, 100-103.
- Henriksen, P. and Jørgensen M., 1985. Selen og manganstatus hos blårvæve i relation til børbetændelse. *Dansk Pelsdyravlerforenings Faglige årsberetning* 175-178.
- Jensen, P. T., Danielsen, V., Nielsen, H. W., 1979. Glutathion peroxydase activity and erythrocyte lipid peroxidation as indices of selenium and vitamin-E status in young pigs. *Acta vet. Scand.* 20, 92-101.
- Mutanen, M. L. and Mykkänen, H. M. Effect of Dietary Fat on Plasma Glutathione Peroxidase Levels and Intestinal Absorption of Se-Labeled Sodium Selenite in Chicks. *J. Nutr.* 114: 829-834, 1984.
- Underwood, E. J.: Trace elements in human and animal nutrition, 4^{ed}. Academic Press, 1977, 302-346.

SCIENTIFUR, VOL.11, No.1, 1987.



**MASSIVE LIPID ACCUMULATION IN MINK LIVER STELLATE CELLS
MAY BE CAUSED BY FUSARIUM MYCOTOXINS IN THE FEED.**

L.-A. Lindberg, Y. Gröhn, E. Karppanen.

Light and electron microscopy of liver samples from mink with a history of stillbirths showed stellate cells filled with lipid droplets of different sizes. These occupied up to 3% of the liver parenchymal volume. The cytoplasm was scanty, containing mainly rough endoplasmic reticulum and, in some cells a Golgi complex and microtubules. Some fatty infiltration of hepatocytes was seen. Smooth endoplasmic reticulum and glycogen were scarce in these cells. Serum and liver homogenate vitamin A levels of these mink were increased about seven and twenty fold respectively. It is suggested that these changes in vitamin A metabolism are caused by mycotoxins in feed. Besides stillbirths, nervous disorders and infertility have also increased in Finland. The problems began after the importation of a large quantity of animal feedstuff. Animal feeds in Finland have yielded six different *Fusarium* mycotoxins.

Acta. Vet. Scand. 26, 3, 423-424, 1985.
2 figs., 4 references.

CAB-abstract.

**GLUCOSURIA ASSOCIATED WITH RENAL CALCULI IN ASIAN SMALL-
CLAWED OTTERS.**

Paul P. Calle, Phillip T. Robinson.

Urine from one female and 2 male Asian small-clawed otters (*Aonyx cinerea*) with bilateral renal calculi, one female with unilateral calculi, and one nonaffected male were evaluated for abnormal urinary crystalloid excretion. One otter with bilateral renal calculi had cystic calculi composed of calcium oxalate monohydrate and dihydrate. The 2 affected males were littermates, as were the 2 affected females, but the 2 litters were from different parents. At the time of the study, the otters did not have clinical signs of disease.

Hematologic and serum biochemical, electrolyte, and enzyme values were normal. The urinary excretion of calcium, oxalate, uric acid, phosphate, citrate, and amino acids in otters with renal calculi was similar to that of the nonaffected otter.

The 4 otters with renal calculi had glucosuria but the nonaffected otter did not have glucosuria. The glucosuria, in the absence of hyperglycemia, suggested a renal tubular transport defect for glucose. Other renal abnormalities were not found.

JAVMA, 187, 11, 1149-1153, 1985.
1 fig., 1 table, 33 references.

Authors' summary.

**OBSERVATIONS ON AN OUTBREAK OF NUTRITIONAL STEATITIS (YELLOW FAT
DISEASE) IN FITCH (*MUSTELA PUTORIUS FURO*).**

H.V. Brooks, C.G. Rammell, J.J.L. Hoogenboom, D.E.S. Taylor.

An outbreak of nutritional steatitis in farmed fitch (*Mustela putorius furo*) caused by feeding high levels of dietary polyunsaturated fat was investigated.

The disease affected mainly 12 to 15 week rapidly growing kits; 793 kits were affected and 183 died. The outbreak was quickly controlled by low-

ering the level of polyunsaturated fat in the diet and administering high doses of vitamin E.

Affected animals had severe generalised steatitis characterised grossly by yellow brown granular fat, which histologically consisted of diffusely necrotic adipose tissue heavily infiltrated with macrophages and neutrophils. There were extensive deposits of PAS-positive, fluorescent lipopigment within macrophages and extracellularly throughout the inflamed fat. Affected fitch had normochromic microcytic anaemia, lowered liver iron levels, increased thrombocytes and acute inflammatory leucograms. Skeletal or cardiac myopathy was not observed grossly or histologically in any of the animals examined.

The diet contained high levels of polyunsaturated fat (7.7% DM), a high proportion being docosahexaenoic and eicosapentaenoic acids which were derived from the squid component (40%) of the ration. The livers from affected fitch contained correspondingly high levels of polyunsaturated fatty acids.

The diet provided 13 mg Vitamin E per fitch daily, which was clearly inadequate considering the high levels of polyunsaturated fat being fed. Liver selenium levels were extremely high as a result of the high selenium levels in the squid portion of the diet.

New Zealand Veterinary Journal, 33, 141-145, 1985.

4 figs., 4 tables, 33 references.

Authors' summary.

INVESTIGATIONS ON RELEVANCE AND CLINICAL AND THERAPEUTICAL CHARACTERISTICS OF SURGICAL DISEASES IN THE NUTRIA.

(Untersuchungen über die Bedeutung sowie klinische und therapeutische Besonderheiten chirurgischer Erkrankungen beim Nutria).

I. Ivascu.

The paper presents a synopsis of surgical diseases of the nutria with special regard on their clinical and therapeutic characteristics.

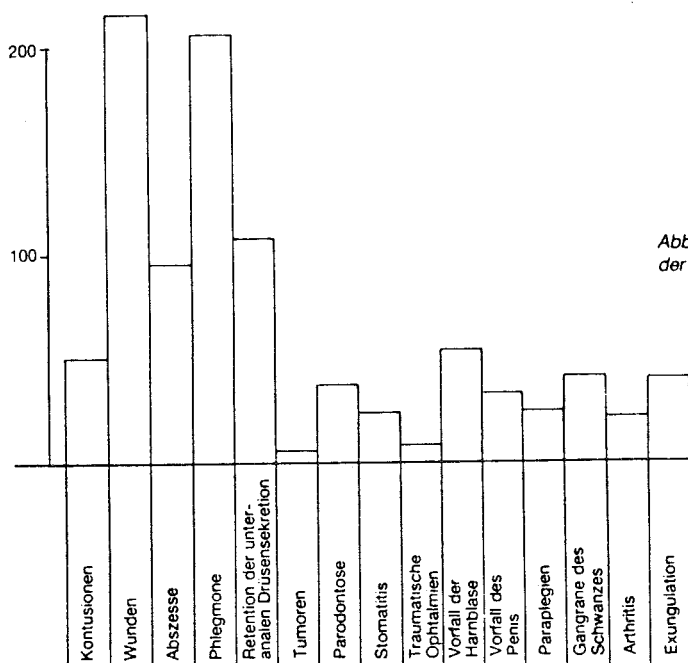


Abb. 1: Fallhäufigkeiten chirurgischer Erkrankungen beim Nutria. Ordinate = Anzahl der Erkrankungsfälle.

Local infection and injuries occurred most often, followed by prolaps of bladder and penis as well as incisival paradontosis and gangrenous fails.

Also the benign retention of the subanal glands is of significance, since this has an influence on the reproduction capability. External tumors occurred in less than 1% of the animals investigated.

Deutsche Tierärztliche Wochenschrift, 92, 11/12, 476-478, 1985.

2 figs., 1 table, 8 references.

Author's abstract.

In GERM. Summary ENGL.

LATEX AGGLUTINATION TEST FOR DETECTING FELINE PANLEUKOPENIA VIRUS, CANINE PARVOVIRUS, AND PARVOVIRUSES OF FUR ANIMALS.

Pirjo M.-L. Veijalainen, Erkki Neuvonen, Aimo Niskanen, Tapio Juokslahti.

A latex agglutination (LA) test for the detection of parvoviruses of fur animals, cats, and dogs was developed, and its sensitivity and specificity were compared with those of hemagglutination (HA) and the enzyme-linked immunosorbent assay (ELISA). Tissue culture isolation was used to confirm the specificity results. Fecal samples from various sources were tested, including specimens from raccoon dogs and mink which were experimentally infected with parvoviruses by oral exposure. LA compared favourably with the other tests. The ELISA was the most sensitive. When it was considered as a reference test, the corresponding sensitivities for HA and LA were 96 and 91%, respectively. The specificities were 93% for the ELISA, 95% for the HA test, and 92% for the LA test. LA seems to be a suitable technique for screening animals in the field and in laboratories in which sophisticated techniques are not available.

Journ. of Clinical Microbiology, 23, 3, 1986.

2 tables, 17 references.

Authors summary.

FUSARIUM MYCOTOXINS AS A PROBLEM IN FINNISH FEEDS AND CEREALS.

Eeva Karppanen, Aldo Rizzo, Seija Berg, Erja Lindfors, Ritta Aho.

During 1983 and 1984 suspected cases of mycotoxicoses occurred among farm animals in Finland. *Fusarium* toxins detected in commercial feed samples associated with cases of mycotoxicosis included deoxynivalenol (1-120 microg/kg) T-2 toxin (23-705 microg/kg), HT-2 toxin (10-207 microg/kg), diacetoxyscirpenol (6-766 microg/kg) and nivalenol (10 microg/kg). Affected animals included rainbow trout, mink, pigs, dogs, reindeer and horses. These outbreaks of mycotoxicosis followed a very wet summer and autumn. Inspections at the feed factories concerned revealed contamination of production lines by toxigenic *F. spp.*, including *F. graminearum* *Gibberella zeae* and *F. poae*.

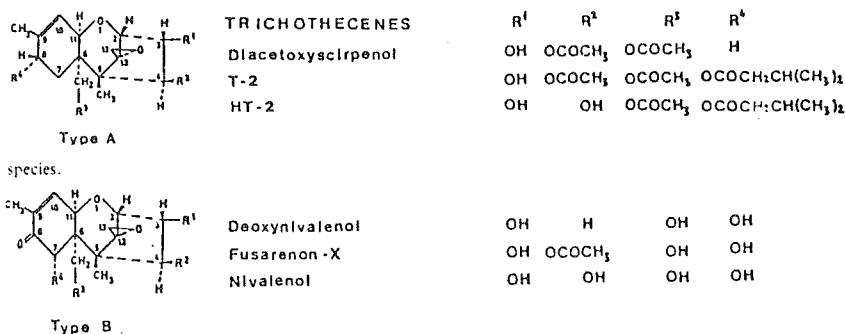


Fig. 1. Structure of six Mycotoxins produced by *Fusarium* species.

J. Agricultural Science in Finland, 57, 3, 195-206, 1985.

3 tables, 5 figs., 15 references.

CAB-abstract.

DEMONSTRATION OF NON-DEGRADED ALEUTIAN DISEASE VIRUS (ADV) PROTEINS IN LUNG TISSUE FROM EXPERIMENTALLY INFECTED MINK KITS.

S. Alexandersen, Å Uttenthal-Jensen, B. Aasted.

Isolated of ADV replicate to rather high quantities in lungs from neonatally infected mink kits. The virus was analysed for polypeptide composition, and for the first time high molecular weight polypeptides have been observed in in vivo produced ADVs. These polypeptides are analogous to those of in vitro produced ADVs. The molecular weights of the structural polypeptides of the low virulence Pullman ADV and the highly virulent DK and Utah I isolates of ADV were found to be 88 kD and 78 kD and in vivo produced ADV-G polypeptides were found to be 85 kD and 75 kD, the same molecular weights as those described for in vitro produced ADV-G. Presence of the ADV coded, non-structural polypeptide with the molecular weight of 71 kD (p71) was also demonstrated in the lung tissue from mink kits.

Archives of Virology, 87, 127-133, 1986.
4 figs., 11 references.

Authors' summary.

MONOCLONAL ANTIBODIES AGAINST ALEUTIAN DISEASE VIRUS DISTINGUISH VIRUS STRAINS AND DIFFERENTIATE SITES OF VIRUS REPLICATION FROM SITES OF VIRAL ANTIGEN SEQUESTRATION.

Richard E. Race, Bruce Chesebro, Marshall E. Bloom, Bent Aasted, James Wolfenbarger.

Monoclonal antibodies (mAbs) were used to study antigenic differences among strains of Aleutian disease virus (ADV) and to characterize viral proteins in vitro and in vivo. A number of ADV field strains could be discriminated, and highly virulent Utah I ADV was clearly delineated from the tissue culture-adapted avirulent ADV-G strain. This specificity could be demonstrated by indirect immunofluorescence against infected cultures of Crandell feline kidney cells or against tissues of Utah I ADV-infected mink. Viral antigens were demonstrated in both the nuclei and the cytoplasm of infected tissue culture cells. However, in mink mesenteric lymph node, spleen, and liver, viral antigen was observed only in the cytoplasm. Absence of nuclear fluorescence suggested that the detected antigen represented phagocytized viral antigens rather than replicating virus. This conclusion was supported by the finding that mAbs reactive only against low-molecular-weight polypeptides derived from intact viral proteins gave the same pattern of in vivo fluorescence as mAbs with broad reactivity for large or small (or both) viral polypeptides. The distribution of infected cells was the same as that described for macrophages in these tissues and suggested that cells of the reticuloendothelial system had sequestered viral antigens.

Journal of Virology, 57, 1, 285-293, 1986.
2 tables, 6 figs., 35 references.

Authors' summary.



Mink Vaccines

Distemper tc[®]

Distemper tc is an injectable distemper vaccine of tissue culture origin that has been proven effective in millions of mink over more than 20 years.

Distox[®]

A combination of three vaccines for preventing Distemper, Virus Enteritis, and Type C Botulism with a single injection.

Distox-Plus[®]

Two Components—to be mixed immediately prior to usage: (1) a lyophilized distemper vaccine grown in chick embryo tissue culture. (2) a diluent containing an inactivated mink enteritis virus grown in a feline tissue culture cell line, combined with Clostridium botulinum Type C bacterin-toxoid, and a Pseudomonas aeruginosa bacterin.

Entox-tc &

Entox-Plus[®]

Entox-tc tissue culture mink virus enteritis-botulinum toxoid Type C combination vaccine is the product of over 20 years of botulism-enteritis research.

Entox-Plus will immunize your mink against three major health problems: hemorrhagic pneumonia, enteritis and botulism.



Schering Corporation, USA



Mink Vaccines

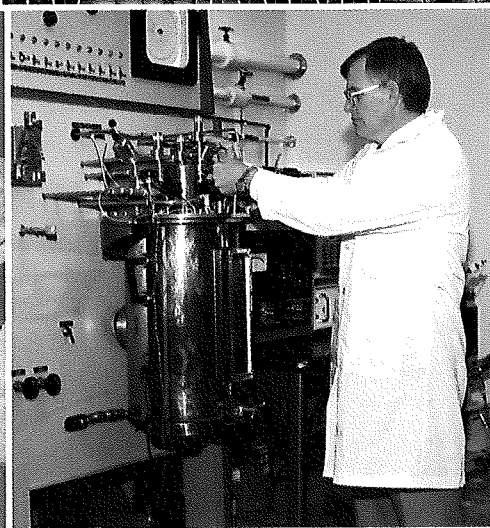
Quality.
Research.
Technical
Service.

On these three pillars, ASL has built the family of proven mink vaccines. It is not surprising, therefore, that so many mink ranchers worldwide have in the past relied upon ASL for their basic vaccination needs . . . or why today they look first to ASL for state of the art health protection for breeding stock and kits.

Technical Service is one of our most important commitments to you. We support our products and we support the people who use them—YOU. Our technical service veterinarians and microbiologists are ready to help you with your problems and recommend the best possible solutions.

The leadership and professional acceptance demonstrated by our success in several areas of veterinary medicine are your assurance that you will always get the newest and most efficacious vaccines from ASL.

For additional information, please contact our International Animal Health Department at:



Essex Chemie AG

Topferstrasse 5
6000 Lucerne 6, Switzerland
Telex: 868160 ESSEXCHEMIE
Tel: (241) 50-1122

Schering Corporation, USA

1011 Morris Avenue
Union, New Jersey 07083, USA
Telex: 138445 SCH POGH UNON
Tel: (201) 820-6225

A CASE OF MINK TUBERCULOSIS CAUSED BY MYCOBACTERIUM BOVIS.

(Bir minkte saptanan tuberkulozis olgusu uzerinde arastirma).

Ömer Akay, Nejat Aydm, Mustafa Arda, Rifki Haziroglu.

In this study, organs of mink died of tuberculosis were examined both macroscopically and microscopically and isolated organisms were identified by biochemical (niacin and nitrate test) and biological (animal inoculation) tests. In the animal inoculation test, 2 rabbits and 2 hens were infected intravenously with isolated microorganisms in dose of 0.5 mg/1 ml for each animal to differentiate the type of tubercle bacillus. On the other hand, 2 guinea pigs were also infected with the same dose. Inoculums were injected into the inguinal lymph nodes of these animals. Two rabbits given Mycobacterium organisms died in 5 to 7 weeks and 2 guinea pigs died in 6 to 8 weeks after infection. But 2 hens to which the same materials were given survived for three months. On the basis of animal inoculations, growth characteristics on artificial medium and biochemical tests, Mycobacterium bovis was diagnosed.

A.Ü. Vet. Fak. Derg., 31, 3, 463-470, 1984.

2 figs., 19 references.

In TURK. Summary ENGL.

Authors' summary.

TYZZER'S DISEASE AS A COMPLICATION OF CANINE DISTEMPER IN A RACCOON.

Zbigniew W. Wojcinski, Ian K. Barker.

Intercurrent canine distemper and Tyzzer's disease were diagnosed in a mature raccoon (*Procyon lotor*) submitted for necropsy. Clinical, gross and microscopic findings characteristic of canine distemper virus (CDV), included ataxia, dyspnea, suppurative conjunctivitis, interstitial pneumonia and generalized lymphocytolysis. Inclusion bodies typical of CDV infection were present in many epithelial tissues. Acute multifocal hepatic necrosis and acute segmental necrotizing enteritis were attributed to the presence of *Bacillus piliformis* organisms in these lesions, confirmed by special stains and electron microscopy. This is apparently the first reported case of Tyzzer's disease in a raccoon.

J. of Wildlife Diseases, 22, 1, 55-59, 1986.

3 figs., 19 references.

Authors abstract.

TOXASCAROSIS IN THE BREEDS OF THE BLUE FOX (*ALOPEX LAGOPUS*).

(Toxaskaroza v chovu pesce polarnych (*Alopex lagopus* L., 1758)).

M. Stanek.

Coprological investigation of females of the stock herd of *Alopex lagopus* L., 1758, over the period of one year showed that more than 70% individuals were infested by *Toxascaris leonina* (Linstow, 1902). Young stock of these females was subjected to dissection in the period of skinning. In spite of dehelminthation carried out 80 days before skinning the occurrence of *T. leonina* in the young stock was high, viz more than 78% of individuals. Relative density reached the value of 4 in females and 5 in males. Dehelminthation treatment is recommended 4 times a year.

Proceedings from: Prospect of Modern Fur Animal Breeding, Nitra, Czechoslovakia, 4.-5. Sept. 1986. 153-156.

In CZEC. Summary ENGL.

Author's summary.

List of addresses

- Akay, Ömer, A.Ü. Veteriner Fakültesi Mikrobiyoloji Anabilim Dalı,
Ankara, Turkey
- Akhmedov, N.M., USSR.
- Alexandersen, S. Dept. of Pathology, Royal Vet. and Agric. Univ.,
Copenhagen, Denmark.
- Anikieva, L.V., USSR.
- Arstila, Jukka, PL 21 (Nurmestie 11) 75530 Porokylä, Finland.
- Askins, G.R., Appalachian Environmental Laboratory, University of
Maryland, Gunter Hall, Frostburg State College Campus, Frostburg,
Maryland 21532, USA.
- Aulerich, R.J., Dept. of Animal Science and Pathol., Ctr. for Environm.
Toxicology, Michigan State University, East Lansing, Michigan
48824, USA.
- Baever, Thomas D., Appalachian Environmental Laboratory, Gunter Hall,
Frostburg State College Campus, Frostburg, Maryland 21532, USA.
- Balakirev, N.A. USSR.
- Barabasz, Boguslaw. Zaklad Hodowli Zwierzat Futerkowych AR w Krakowe,
Poland.
- Barta, M., Vyskumny ustav zivocisnej vyroby, 949 92 Nitra, Hlohovska 2,
Czechoslovakia.
- Bednarz, M., Szkola Glowna Gospodarstwa Wiejskiego, Akademia Rolnicza w
Warszawie, Inst. Hodowli Zwierzat i Techn. Produkcji Zwierzecej,
Zaklad Hodowli Zwierzat Futerkowych, Poland.
- Belyaev, D.K., Inst. of Cytology and Genetics, Academy of Sciences of
the USSR, Sibirian Division, 630090 Novosibirsk, USSR.
- Berestov, V.A., Institut biologie, Karelská pobočka Akadémie vied ZSSR,
Petrozavodsk, ZSSR.
- Boissin-Agasse, Line. Ctr. d'Etudes biologiques des Animaux Sauvages -
CNRS Villiers-en-Bois, Beauvoir-sur-Niort 79360, France.
- Brooks, H.V., Palmerston North Animal Health Laboratory, P.O. Box 1654,
Palmerston North, New Zealand.
- Calle, Paul P., Cheyenne Mountain Zoo, P.O. Box 158, Colorado Springs,
CO 80901, USA.
- Chapman, Joseph A., Appalachian Environm. Lab., Ctr. for Environment
and Estuarine Studies, Univ. of Maryland, Frostburg State College
Campus, Gunter Hall, Frostburg, Maryland 21532, USA.
- Cherednichenko, Yu. N., D.I. Ivanovsky Inst. of Virology, USSR Academy
of Medical Sciences, 123098 Moscow, USSR.
- Cooper, John E. Royal College of Surgeons of England, 35-43 Lincoln's
Inn Fields, London WC2, England.
- Dawson, F.L.M.,
- Dick, T.A., Dept. of Zoology, University of Manitoba, Winnipeg,
Manitoba, R3T 2N2, Canada.
- Dixon, Kenneth R., Appalachian Environm. Lab., Univ. for Maryland Ctr.
for Environmental and Estuarine Studies, Frostburg State College,
Campus, Gunter Hall, Frostburg, Maryland 21532, USA.
- Donovan, B.T., Dept. of Physiology, Inst. of Psychiatry, De Crespigny
Park, London SE5 8AF, England.
- Dudas, A., Industrija Usnja, 61360 Vrhnik, Juhoslavia.
- Dunn, J.P., Pennsylvania Game Commission, Rt. 3, Box 61F, Bosell, Penn.
15531, USA.
- Einarsson, E.J., Norges Landbrukshøgskole, Inst. for fjørfe og pelsdyr,
Box 17, 1432 Ås-NLH, Norge.

- Eriskovskaya, N.K., Inst. of Cytology and Genetics, Siberian Division, Academy of Sciences of the USSR, 630090 Novosibirsk, USSR.
- Fjeldin, Kristian, Norges Pelsdyrslag, Økern torgvei 13, 0580 Oslo 5, Norway.
- Frindt, A., Szkole Główna Gospodarstwa Wiejskiego, Akademia Rolnicza w Warszawie, Inst. Hodowli Zwierząt i Tech. Produkcji Zwierzęcej, Poland.
- Fukase, Tohru, Dept. of Parasitology, School of Vet. medicine, Azabu Univ., Fuchinobe, Sagamihara 229, Japan.
- Galatik, A., SVST Bratislava, detasovane pracoviste Chemickotechn. fakulty, pri n.p. Svit, 765 82 Otrokovice, Czechoslovakia.
- Gelbert, M.D., USSR.
- Giles, K.H., Advisory Services Division, Ministry of Agriculture and Fisheries, Rotorua, New Zealand.
- Ginther, O.J., Dept. of Vet. Science, University of Wisconsin, Madison, WI 53706, USA.
- Greve, J.H., Dept. of Veterinary Pathology, Iowa State University, USA.
- Hansen, Mogens. Danish Fur Breeders Association, 60 Langagervej, DK 2600 Glostrup, Denmark.
- Hillemann, Georg. Research Station Nord, Hundelevej 75, Nr. Rubjerg, DK 9480 Løkken, Denmark.
- Hockman, J. Gregory, Dept. of Fisheries and Wildlife, Coll. of Natural Resources, Utah State University, Logan, Utah 84322, USA.
- Hornshaw, T.C. Dept. of Animal Science, Michigan State University, East Lansing, Michigan 48824-1225, USA.
- Iokem, A., Chaire de Virologie-Immunologie et Pathologie des maladies virales, Fac. de Med. vet., 45, rue des Veterinaires, B-1070 Bruxelles, Belgique.
- Ivascu, I. 2110 De Salaberry, app. 6 Montreal, Quebec, Canada H3M 1K7.
- Jakubicka, I., Vyskumny ustav zivocisnej vyroby, Hlohovska 2, 949 92 Nitra, Czechoslovakia.
- Janda, R., KARA, n.p., Domazlicka 2, 613 00 Brno, Czechoslovakia.
- Jensen, Wayne A., Dept. of Vet. Clinical Sciences, and Pathology, Iowa State University, Ames, IA 50011, USA.
- Jørgensen, Mogens. Mosbjerg, DK 9870 Sindal, Denmark.
- Karppanen, E., Natl. Vet. Inst., P.Box 368, 00101 Helsinki, Finland.
- Kiiskinen, Tuomo. Agric. Res. Ctr., Dept. of Animal Husbandry, SF 31600 Jokioinen, Finland.
- Kladovshchikov, V.F., USSR.
- Klimowicz, K., Wojcodysky wybor Polskeho zväzu chovatelov drobných zvierat, Krakow, Poland.
- Knezik, J., Univ. of Vet. Medicine, Kosice, Dept. of Internal. Disease and Pharmacology, Czechoslovakia.
- Konnerup-Madsen, H., Agerledet, DK 9300 Søby, Denmark.
- Konrád, J., Vysoká škola veterinární, 602 00 Brno.
- Korhonen, Hannu. Dept. of Applied Zoology, University of Kuopio, POB 6, SF 70211 Kuopio 21, Finland.
- Kozevnikova, L.K., Institut biologie, Karelská pobočka Akademie Vied ZSSR, Petrozavodsk, ZSSR.
- Kuban, J., Ustredny vybor Slovenskeho zväzu chovatelov, Steinerova 44, 824 76, Bratislava, Czechoslovakia.
- Kukla, F., Katedra zoologie a chovu drobných hospodarských zvierat AF VSZ v Brne, Zemedelska 1, 613 00 Brno, Czechoslovakia.
- Kuzma, J., Movis, narodny podnik, m 908 51 Holic, Czechoslovakia,

- Kvalheim, Erling, Steinspranget 68, N-Oslo 11, Norway.
- Lindberg, L.-A., Dep. Anat., Coll. Vet. Med. P.O. Box 6, SF 00551 Helsinki, Finland.
- Literak, I., Vysoka skola veterinarni, Palackeho 1-3, 612 42 Brno, Czechoslovakia.
- Lizenko, E.I., Petrozavodsk, USSR.
- Lochelt, M., Inst. f. Virologie, Tierärztl. Hochschule, D-3000 Hannover, GFR.
- Löliger, H.-C., Arbeitsgebiet Hygiene und Krankheiten des Inst. für Kleintierzucht, Dörnbergstr. 25/27, 3100 Celle, GFR.
- Lund, R. Sandø, Research Station West, 112 Herningvej, Tvis, DK 7500 Holstebro, Denmark.
- Lutsenko, N.D., Inst. of Cytology and Genetics, Siberian Branch, Academy of Sciences of the USSR, 630090 Novosibirsk, USSR.
- Maciejowski, J., Inst. Biologicznych Podstaw Produkcji Zwierzecej Akademii Rolniczej w Lublinie, Poland.
- Mäkinen, Auli. Dept. of Applied Zoology, University of Kuopio, P.O.B. 138, SF 70101 Kuopio 10, Finland.
- McGinley, Mark A., Dept. of Biology, Univ. of Utah, Salt Lake City, UT 84112, USA.
- Miclea, M., Romania,
- Moreland, A.F., Dept. of Special Clin. Sciences, College of Vet. Med., Univ. of Florida, Gainesville, FL 32610, USA.
- Mowbray, Elmer E., Horn Point Environmental Laboratories, Center for Environmental and Estuarine Studies, University of Maryland, Cambridge, Maryland 21613, USA.
- Mouka, J. Ustredi veterinarnich asanacnich ustavu CSR, Pisnice 313, 144 00 praha 4, Czechoslovakia.
- Møller, Ordin M., Dept. of Animal Husbandry and Genetics, Norwegian College of Vet. Med., Postbox 8146 Dep., Oslo 1, Norway.
- Nelson, B.B., US Bureau of Land Management, Laramie, Wyoming, USA.
- Nemetallah, B.R., Dept. of Vet. Med., Edfina, Alexandria University, Alexandria, Egypt.
- Nitray, J., Vyskumny ustav zivocisnej vyuroby, Hlohovska 2, 949 92, Nitra, Czechoslovakia.
- Nukerbaeva, K.K., Zool. Inst., Acad. of Science of the Kazakh SSR, Alma-Ata, USSR.
- O'Shea, Thomas J., U.S. Fish and Wildlife Service, Patuxent Wildlife Research Center, Laurel, Maryland 20811, USA.
- Parkanyi, V., Vyskumny ustav zivocisnej vyuroby, Hlohovska 2, 949 92, Nitra, Czechoslovakia.
- Pasanen, Seppo. Dept. of Biology, University of Joensuu, Finland.
- Penner, J.D., Dept. of Vet. Microbiology and Pathology, College of Vet. Med., Washington State University, Pullman, Washington 99164, USA.
- Pereldik, D.N., USSR.
- Persin, M., Statni veterinarni ustav, Liberec 30, 463 11 Vratislavice nad Nisou, Czechoslovakia.
- Pilipchuk, O. Ya, USSR.
- Polidori, G. A., Instituto di Parassit. dell'Univ. di Perugia, Italy.
- Rabinowitz, Alan R., Ecology Program, Uni. of Tennessee, Knoxville, Tennessee 37916, USA.
- Race, Richard E. Royal Vet. and Agric. University, Copenhagen, Denmark.
- Rafay, J., Výskumný ústav Zivocisnej výroby, Hlohovská 2, 949 92 Nitra, Czechoslovakia.

- Rammell, C.G. Central Animal Health Laboratory, Ministry of Agriculture and Fisheries, Upper Hut, New Zealand.
- Reed, Willie M., Animal Disease Diagnostic Laboratory and the Electron Microscopy Laboratory, School of Vet. Med., Purdue University, West Lafayette, IN 47907, USA.
- Rider, V., Dept. of Cell Biology, Baylor College of Medicine, Texas Medical Ctr., Houston, Texas 77030, USA.
- Rose, Jack, Dept. of Animal Science, Oregon State University, Corvallis, Oregon 97331, USA.
- Sabrnak, J., Vysoka skola zemedelska, Zemedelska 1, 613 00 Brno, Czechoslovakia.
- Schantz, Torbjörn. Dept. of Animal Ecology, Univ. of Lund, Ecology Building, S 223 62 Lund, Sweden.
- Scheuring, W., Dyrekcja Wojewódzkiego Zakładu Weterynarii, 65-218 Zielone Góra.
- Sekerka, D., Vysoka skola polnohospodarska, Lomonosovova 2, 949 76 Nitra, Czechoslovakia.
- Sidlovsky, A., Plemenarsky podnik v. Ziline, postovy priecinok, c. A-17, O11 67 Zilina, Czechoslovakia.
- Simoës-Numes, C. Labs. de Physiologie de la Nutrition, Toisons et Fourrures, I.N.R.A., 78350 Jouy-en-Josas, France.
- Slesarenko, N.A., Doklady Vsesoyuznoi Akademii, Sel'skokhozyaistvennykh Nauk Im. V.I. Lenina, USSR.
- Sherfy, Frederick C., Appalachian Environm. Lab., Ctr. for Environm. and Estuarine Studies, Frostburg, Maryland 21532, USA.
- Slugin, V.S., USSR.
- Smith, Donald D., Dept. of Pathology and Oncology, Univ. of Kansas Med. Ctr., 39th Street and Rainbow Boulevard, Kansas City, Kansas 66103, USA.
- Smith, Richard A., Dept. of Biology, Memphis State University, Memphis, Tennessee 38152, USA.
- Snyder, Daniel E., Dept. of Vet. Pathobiology, University of Illinois, 2001 South Lincoln Avenue, Urbana, Illinois 61801, USA.
- Sokov, A.I., USSR.
- Solari, A.J., Ctr. de Investigaciones en Reproduccion, Fac. de Med., Paraguay 2155, (1121) Buenos Aires, Argentina.
- Stanek, M., Katedra zoologie a chovu drobných hospodarkých zvirat AF VSZ v Zemedelska 1, 613 00 Brno, Czechoslovakia.
- Starek, M., Plemenarske vyskumne stredisko SPP, Nitra, Czechoslovakia.
- Stolze, B., Inst. f. Virologie, Tierärztl. Hochschule, D-3000 Hannover, GFR.
- Sundqvist, Christer. Åbo Akademi, Dept. of Biology, Porthansgatan 3B, SF 20500 Turku 50, Finland.
- Szeleszczuk, O., Zakład Hodowli Zwierząt Futerkowych, Akademia Rolnicza w Krakowie, Poland.
- Takahana, Kazushige, Lab. of Vet. Anatomy, Dept. of Vet. Med., College of Dairying, Ebetsu, Hokkaido 069, Japan.
- Taranov, G.s., USSR.
- Thompson, James P., Dept. of Immunology and Medical Microbiology, Box J-266 JHMHC, College of Medicine, Univ. of Florida, Gainesville, Florida 32610, USA.
- Tocka, I., Vysoka skola polnohospodársja v Nitre, Lomonosova 2, Czechoslovakia.

- Työppönen, Jouko. Coll. Vet. Med., Dept. of Biochem., Box 6, SF 00551 Helsinki, Finland.
- Urlings, H.A.P., Fur Animal Veterinarian, Kaar 1, 5374 JX Schaijk, The Netherlands.
- Valtonen, Maija. Finnish Fur Breeders Association, POB 5, 01601 Vanda 60, Finland.
- Varnagiris, A., USSR.
- Veijalainen, Pirjo M.-L. Natl. Vet. Inst., SF 00101 Helsinki, Finland.
- Weiss, Vilhelm, Research Station West, Herningvej 112, Tvis, 7500 Holstebro, Denmark.
- Wendland, B., 1503 Potsdam, Pappelallee 2, GDR.
- Wenzel, Ulf D., Goldschmidtstrasse 21, 7010, Leipzig, GDR.
- Whiteley, Herbert E., Dept. of Vet. Pathobiology, Coll. of Vet. Med., University of Illinois, Urbana, IL 61801, USA.
- Wigal, Ronald A., West Virginia Department of Natural Resources, Charleston, WV 25311, USA.
- Willner, Gale R., Appalachian Environm. Lab., University of Maryland, Frostburg State College Campus, Gunter Hall, Frostburg, Maryland 21532, USA.
- Vladimirov, A.V., USSR.
- Wojcik, S. Inst. Zywienia i Higieny Zwierzat AR w Lubline, Poland.
- Woloszyn, Stanislaw, Klinika Chorób Zakaźnych Zwierzat Wydziału Weterynaryjnego AR, ul. Aleje PKWN 30, 20-612 Lublin.
- Woncinski, Zbigniew W., Dept. of Pathology, Ontario Vet. Coll., University of Guelph, Guelph, Ontario N1G 2W1, Canada.
- Zatko, S., Plemenarsky podnik v. Ziline, postovy priecinok c. A-17, 011 67 Zilina, Czechoslovakia.
- Zhdanova, N.S., Inst. of Cytology and Genetics, Siberian Branch, Academy of Sciences of the USSR, 630090 Novosibirsk, USSR.
- Zucker, Elizabeth E., U.S. Environmental Protection Agency, Washington, DC 20460, USA.

