

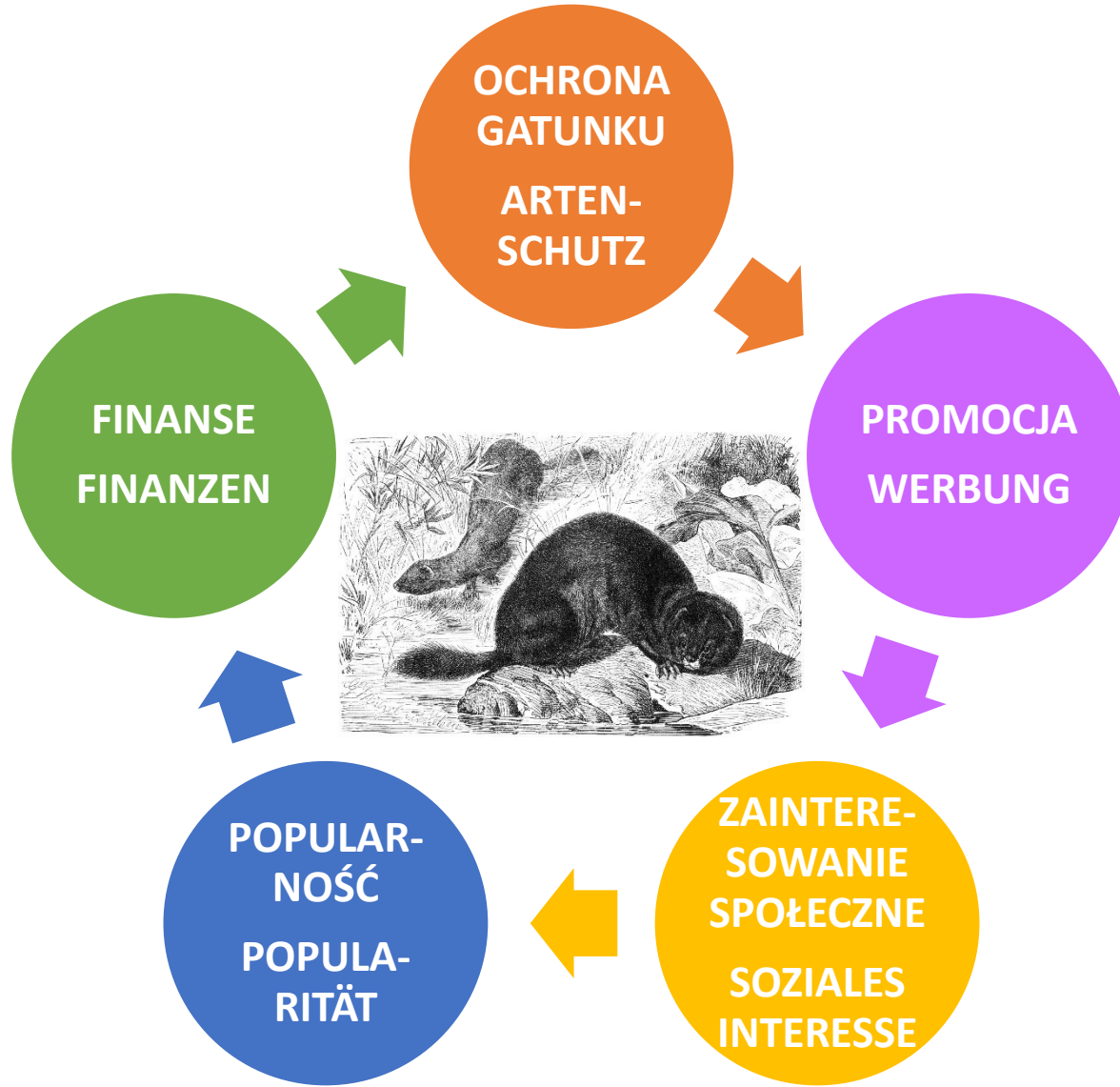
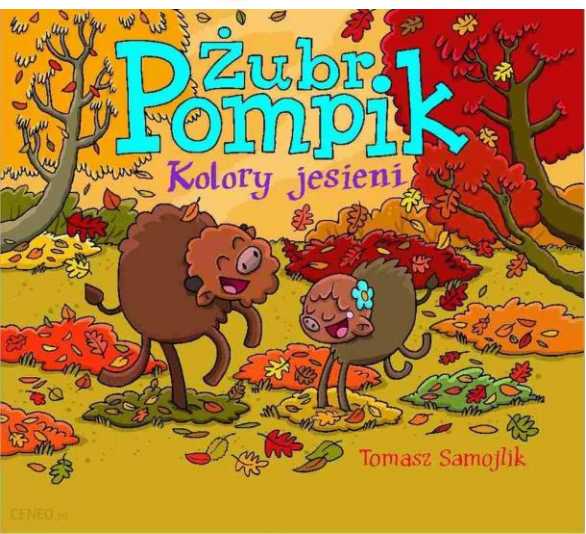


Polish Society for
Conservation Genetics LUTREOLA



Platforma internetowa "Centrum Norki Europejskiej" jako przykład wykorzystania narzędzi cyfrowych w ochronie gatunku krytycznie zagrożonego wymarciem

dr inż. Jakub Skorupski



panda wielka / Großer Panda

vs.

norka europejska / Europäischer Nerz



NOT EVALUATED	DATA DEFICIENT	LEAST CONCERN	NEAR THREATENED	VULNERABLE	ENDANGERED	CRITICALLY ENDANGERED	EXTINCT IN THE WILD	EXTINCT
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Konwencja Berneńska / Berner Konvention

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Brak świadomości społecznej / mangelndes
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Review

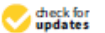
Fifty Years of Research on European Mink *Mustela lutreola* L., 1761 Genetics: Where Are We Now in Studies on One of the Most Endangered Mammals?

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Received: 2 October 2020; Accepted: 6 November 2020; Published: 11 November 2020



Abstract: The purpose of this review is to present the current state of knowledge about the genetics of European mink *Mustela lutreola* L., 1761, which is one of the most endangered mammalian species in the world. This article provides a comprehensive description of the studies undertaken over the last 50 years in terms of cytogenetics, molecular genetics, genomics (including mitogenomics), population genetics of wild populations and captive stocks, phylogenetics, phylogeography, and applied genetics (including identification by genetic methods, molecular ecology, and conservation genetics). An extensive and up-to-date review and critical analysis of the available specialist literature on the topic is provided, with special reference to conservation genetics. Unresolved issues are also described, such as the standard karyotype, systematic position, and whole-genome sequencing, and hotly debated issues are addressed, like the origin of the Southwestern population of the European mink and management approaches of the most distinct populations of the species. Finally, the most urgent directions of future research, based on the research questions arising from completed studies and the implementation of conservation measures to save and restore *M. lutreola* populations, are outlined. The importance of the popularization of research topics related to European mink genetics among scientists is highlighted.

Keywords: conservation genetics; cytogenetics; endangered species; genetic markers; genomics; mitogenomics; *Mustela* sp.; Mustelidae; phylogenetics; population genetics

1. Introduction

Due to ongoing population depletion, both in terms of the actual number of individuals and area occupied, European mink *Mustela lutreola* L., 1761 is considered one of the most endangered mammalian species in the world [1,2]. The species was originally spread over most of continental Europe, but nowadays only three wild, isolated, declining populations occupying less than 3% of the former range survive [3]. About 5000 individuals are estimated to persist in the wild [3]. Reintroduced populations were established in Estonia and Germany [2]. The main cause of the situation of this species is habitat loss and fragmentation, overhunting, and the effects of introduced invasive American mink *Neovison vison* [4]. The alarming situation of the species is proven by its categorization as critically endangered (CR) by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species, and it is listed in Annex II to the Bern Convention on the Conservation of European Wildlife and Natural Habitats, Annexes II and IV (priority species) of the Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, and in The Carpathian List of Endangered Species (critically endangered species (CR)) [2,5].

Utrata siedlisk – melioracje, regulacja rzek (Claudius 1866, Maran 2007).

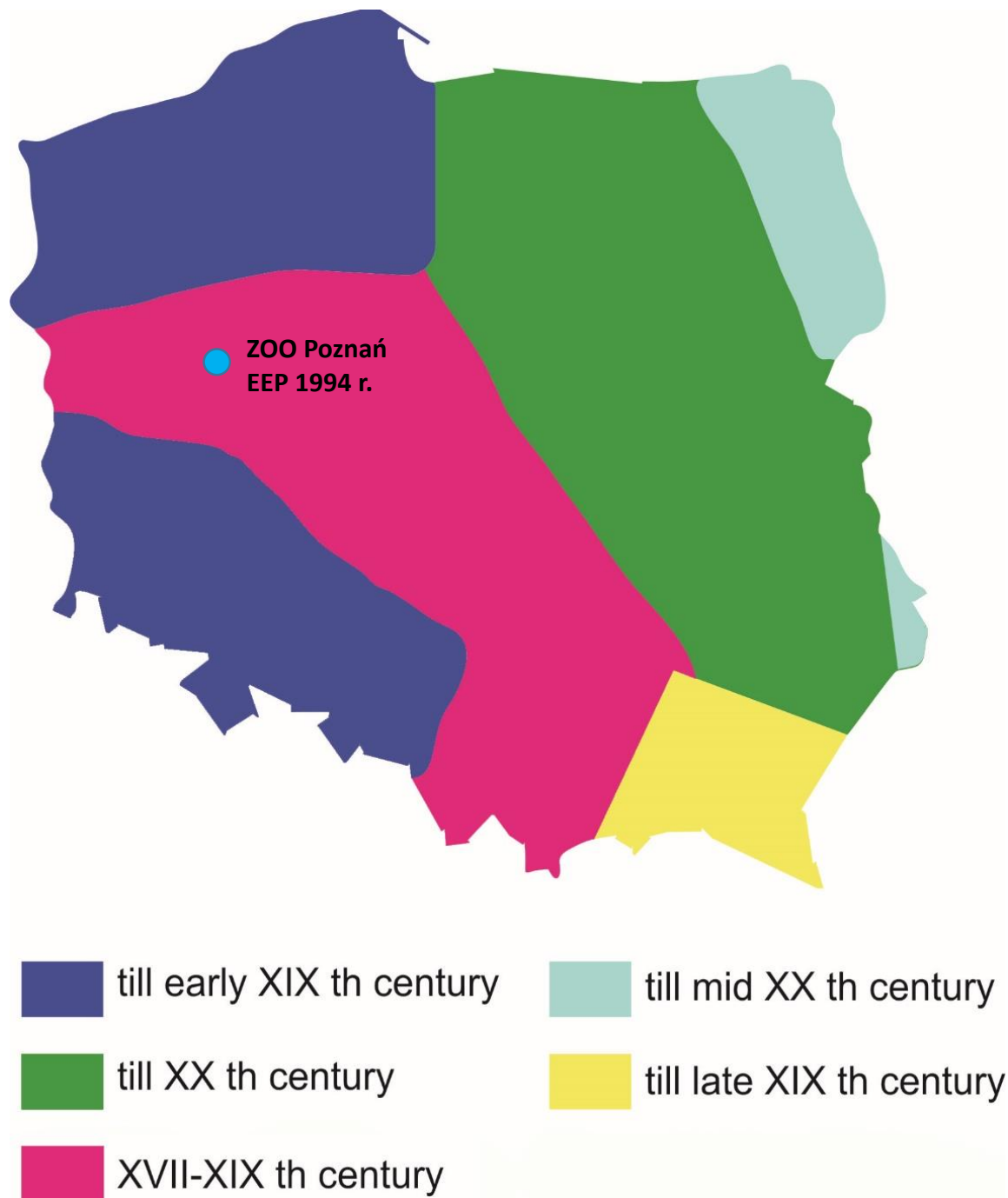
Łowiectwo – w latach 1922-1924 pozyskano w ZSSR 50-75 tys. skórek norczych (Novikov 1939, Nowak 1999).

Hybrydyzacja *M. lutreola* × *M. putorius* (Lode et al. 2005, Maran 2007, Amistlavsky 2008).

Zanieczyszczenie środowiska (Schropfer & Paliocha 1989, Lode 2002, Maran 2007).

Wzrost liczebności średnich drapieżników – zachwianie równowagi ekologicznej (Maran & Henttonen 1995).





Wpływ *N. vison* – agresja międzygatunkowa, przewaga reprodukcyjna, *surplus killing*, ekspansywność terytorialna (Jedrzejewska & Jędrzejewski 1989, Kossak 1989, Sidorovich i in. 1999, Cena et al. 2003, Maran 2007).

Zawleczone choroby – choroba aleucka, myksomatoza (Manas et al. 2001, Maran 2007).

Efekt wąskiego gardła genetycznego – spadek różnicowania genetycznego populacji (Lode 1999).

Zmiany klimatu – wahania wpływu klimatu morskiego i kontynentalnego (Voipio 1946).

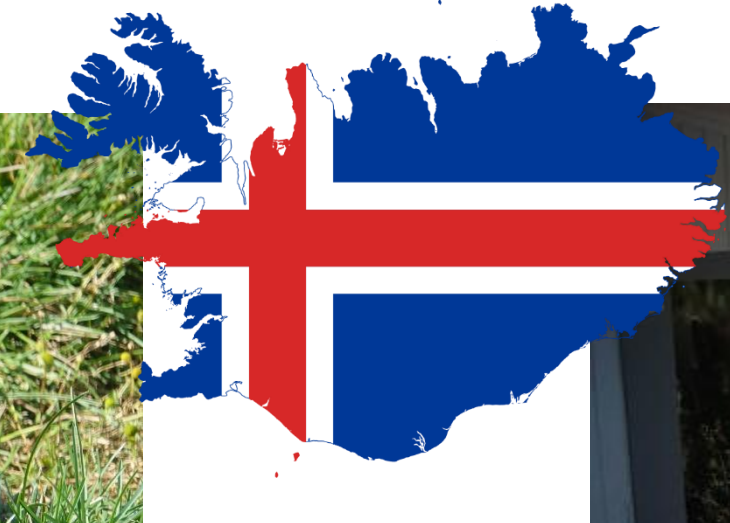


EU Regulation 1143/2014 on Invasive Alien Species



Sprawa beznadziejna / hoffnungsloser Fall ?

Dobre praktyki w innych „beznadziejnych przypadkach” / gute Praktiken in anderen „hoffnungslosen Fällen“





Reintroduction of the European mink *Mustela lutreola* in Saarland, Germany. Preliminary data on the use of space and activity as revealed by radio-tracking and live-trapping

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ABSTRACT: As an attempt to help conserve the endangered European mink *Mustela lutreola* (Linnaeus, 1761), a reintroduction program was started in a nature reserve in Saarland, Germany; the present study is part of this ongoing reintroduction project. Within the first 2 yr period, 48 (16 ♂, 32 ♀) founder animals were reintroduced, out of a total of about 75 animals intended for release in the course of the 3 yr project. Prior to reintroduction, the animals were acclimatized using soft-release pens where they were preconditioned with natural prey. A number of individuals (n = 18) were set free in groups of mating partners (♂♂, ♀♀) and in mother-offspring groups. Thirty-three European mink (14 ♂, 19 ♀) were fitted with intraperitoneal transmitters and radio-tracked and surveyed via live-trapping. Animals were monitored from April 2006 to May 2008 to determine the distribution, size and temporal changes in home range. Released animals showed linear home ranges spreading along rivers and brooks. Home range sizes were 7.2 km (88 ha) for 1 adult male, 0.2–5.9 km (1–505 ha) for adult females, around 1.7–5.6 km (17–132 ha) for juvenile males and 9.2 km (778 ha) for 1 juvenile female, respectively. The released adults showed inter-, but only few intra-, sexual home range overlaps. In contrast, juveniles did not show any home range overlaps. In winter, home range size decreased to a minimum of about 1 km. Further, home range size for females decreased around parturition but increased successively at time of weaning. The activity pattern of released animals was highest at night (especially around dusk and dawn).

KEY WORDS: Release · Reintroduction · Home range · Intrasexual · Intersexual · *Mustela lutreola* · Movement pattern

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INTRODUCTION

Reintroduction as a conservation tool seeks to restore viable populations of native species within their historical range through the release of wild or captive-bred individuals following extirpation or extinction in the wild (IUCN 1998). However, reintroduction programs of endangered mammals, especially carnivores, are associated with high effort. Previous reviews have highlighted several factors that appear to contribute to their success or failure (Griffith et al. 1989, Stanley

Price 1991, Beck et al. 1994, Beck 1995, Wolf et al. 1996, Reading & Clark 1997, Fischer & Lindenmayer 2000, Breitenmoser et al. 2001, Seddon et al. 2007, Stamps & Swaisgood 2007, Jule et al. 2008). The main biological and ecological factors that influence successful reintroductions include habitat suitability, natal habitat preference, long-term food availability, season of release, type of release (soft or hard) and source (wild-caught or captive-born) of released animals.

To help conserve the European mink and to gain insight into the biology of this species *in situ*, a reintro-



Projekt „Centrum Norki Europejskiej – modelowy system działań w zakresie ochrony przyrody w dobie pandemii COVID-19” / „Das Europäische Nerzzentrum – neue Ansätze für Aktivitäten im Bereich des Naturschutzes in der Zeit der COVID-19-Pandemie”



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CENTRUM NORKI EUROPEJSKIEJ / DAS EUROPÄISCHE NERZZENTRUM

- Platforma internetowa – *hub* informacyjny i *think tank* w zakresie biologii konserwatorskiej *M. lutreola*.
- Katalogowanie i digitalizacja zasobów bibliograficznych i okazów muzealnych (kolekcji zoologicznych) i udostępnianie ich w ogólnodostępnej internetowej bazie zasobów.
- Wirtualna platforma dedykowana współpracy międzynarodowej w zakresie ochrony norki europejskiej.
- Internetplattform – Informationsdrehscheibe und Denkfabrik für die Naturschutzbiologie der Europäischen Nerz fungiert.
- Katalogisieren und Digitalisieren von bibliografischen Ressourcen und Exemplaren von Museen und deren Bereitstellung in einer öffentlichen Online-Ressourcendatenbank.
- Virtuelle Plattform zur internationalen Zusammenarbeit im Bereich der Erhaltung von *M. lutreola*.

CELE / ZIELE

- Popularyzacja i promocja idei ochrony gatunku.
- Stworzenie korzystnych warunków do ochrony gatunkowej w przestrzeni publicznej.
- Wspieranie działań konserwatorskich (dzielenie się wiedzą i doradztwo w zakresie jej wdrażania).
- Inicjowanie i wspieranie działalności naukowo-badawczej w zakresie biologii konserwatorskiej norki europejskiej.
- Popularisierung und Förderung der Idee des Artenschutzes.
- Schaffung günstiger Bedingungen für den Artenschutz im öffentlichen Raum.
- Unterstützung von Naturschutzaktivitäten (*know what* und *know how*).
- Initiierung und Unterstützung von wissenschaftlichen und Forschungsaktivitäten im Bereich der Europäischen Nerzschutzbiologie.

DZIAŁANIA / AKTIONEN

- Analiza dostępnej literatury w j. polskim i niemieckim.
- Kwerendy, katalogowanie, digitalizacja i udostępnianie zasobów bibliograficznych i zbiorów muzealnych poświęconych norkce europejskiej w formie repozytorium cyfrowego.
- Uruchomienie www.europeanminkcentre.org.
- Promocja Centrum (broszura, roll-up).
- Obchody Dnia Norki Europejskiej (31 marca).
- Analyse der verfügbaren polnischen und deutschen Literatur.
- Durchführen von Abfragen, Katalogisieren, Digitalisieren und Teilen von bibliografischen Ressourcen und Museumssammlungen zu *M. lutreola* in Form eines digitalen Repositoriums.
- Start der Website www.europeanminkcentre.org.
- Förderung des Zentrums (Broschüre, Roll-up).
- Feier zum Europäischen Nerztag (31. März).

**Dziękuję za uwagę
i zapraszam
do współpracy!**

**Vielen Dank für Ihre
Aufmerksamkeit und
ich lade Sie zur Zu-
sammenarbeit ein!**

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