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The Eurasian lynx in Continental Europe

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Original contributions and short notes about wild cats are welcome
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Cover Photo: Camera trap picture of two Eurasian lynx kittens in north-eastern Switzerland. 11 December 2014 (Photo KORA).

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EAZA breeding programmes as sources for lynx reintroductions

The use of captive-born lynx for reintroduction programmes has been controversially discussed in the past, but projects such as the reintroduction in the Harz Mountains have demonstrated that zoo-born lynx can adapt to living in the wild. However, phylogenetic considerations require that the zoo-based population is known and that subspecies are bred in separate lines. EAZA has established ESBs for *Lynx lynx lynx* and for *Lynx lynx carpathicus*. In the future, these ESBs could also serve as source populations for reintroduction, provided that sensible protocols for breeding, husbandry, and training of lynx to be released to the wild are developed and followed.

The reintroduction projects in the Kampinos area (Poland; Böer et al. 1994, Blomquist et al. 1999) starting 1992 and in the Harz Mountains (Germany; Anders & Middelhoff 2021) starting in 2000 prompted an ongoing discussion on the suitability of zoo-born lynx for the creation of free-living populations (e.g. Wotschikowsky et al. 2001). The dispute was not only about the fitness of captive lynx for living in the wild, but also about the phylogenetic origin of the lynx in zoos. A preliminary inquiry by the European Association of Zoos and Aquaria (EAZA), an association of scientifically led zoos, revealed that even zoos of the association were not certain what "kind" of lynx that they owned, as no specific breeding management for Eurasian lynx in European zoos existed so far (Versteege 2005; 2009).

In 2002 the EAZA established a European studbook (ESB) for Eurasian lynx (Versteege 2009). Several subspecies are represented within the European zoo population. An assessment by the EAZA Felid Taxon Advisory Group (TAG) suggested focusing on breeding of Northern lynx *Lynx lynx lynx* and Carpathian lynx *Lynx lynx carpathicus* as the only sustainable populations (A. Sliwa, pers. comm.). Although the taxonomy of Eurasian lynx was long debated and sometimes differently interpreted, this is concurring with the most recent taxonomic classification and assignment to subspecies in Continental Europe by the IUCN Cat Specialist Group (Kitchener et al. 2017). These two ESBs are representing two prominent subspecies living in Europe, as no captive population of the Balkan lynx *Lynx lynx balcanicus* exists. All other subspecies, hybrids and specimens of unknown origin living in EAZA zoos have been pooled in a phase-out-population, currently still at 120 individuals (Lengger 2020) to provide space for these two subspecies. Since then, Carpathian lynx numbers have tripled from 50 individuals in 2002 to 154 specimens kept in 56 institutions in 2019 (Fig. 1, 2; Lengger 2020). The Northern lynx ESB population presently stands at 184 (Fig. 3). After a decade of population growth, EAZA zoos have reached their maximum carrying capacities, which required a reduction of breeding recommendations by the studbook in recent years (Lengger 2020). The goal of the zoo populations is also to include as much of the gene pool as possible. Presently under-represented lineages will be furthered and new founders may enter the population in the future. However, some of the founders of the ESB population with unknown parentage have been classified on morphological traits only and could hence be crossbreeds of several subspecies. A molecular genetics study could help to clarify this risk (Versteege et al. 2017) and is now initiated.

In the past, reintroductions with captive bred lynx (Kampinos National Park, Poland, 1992–1999, Harz Mts., Germany, 2000–2007) have been conducted with varying success (Breitenmoser & Breitenmoser-Würsten 2008, Anders & Middelhoff 2021). The Harz project has demonstrated that lynx born and/or grown up in captivity can be used for reintroduction. However, anecdotal observations suggest that not all animals can adapt to living in the wild. We assume that, besides individual differences, breeding, husbandry, and training of captive-born lynx are crucial for their successful releasing, and that these aspects hence require specific consideration and protocols.

Beside reintroducing populations to former distribution areas, the genetic restoration of existing wild lynx populations could be a future scenario for the use of captive animals (Bonn Lynx Expert Group 2021). Therefore a full genetic evaluation of the current zoo population is needed, as in the past some individuals of unknown parentage were assumed to be of pure subspecies origin based on phenotypic traits (Versteege 2009). Besides their phylogenetic origin, the genetic variability (e.g. heterogeneity) of the zoo populations compared to the wild source populations needs to be known and considered.

We are convinced that zoos could play a significant role in the efforts to restore or remedy lynx populations in Europe. Zoo-born lynx would have, compared to wild-caught specimens, some considerable advantages,

Fig. 1. Carpathian lynx male in Dortmund Zoo (Photo A. Sliwa).

as their individual genetic background and their health status can be established long before the translocation. Although husbandry guidelines for Eurasian lynx in EAZA zoos exist (Krelecamp 2004) these have to be specified to a much greater degree for the specific purpose of providing lynxes for reintroduction and restocking. Detailed protocols for breeding, husbandry, training and rewilding such lynx will have to be jointly developed by lynx experts, the EAZA Felid TAG and ESB, and relevant IUCN SSC institutions (e.g. Cat Specialist Group, Conservation Translocation Specialist Group (formerly Reintroduction SG), and LCIE). These protocols must then be adhered to, and each zoo/lynx holding facility potentially participating in such a programme would have to fulfil a strict list of requirements, which will also include the veterinary and behavioural testing of lynx to be released. The Carpathian lynx ESB could soon be ready to provide animals for breeding for release in the respective range (Fig 1 in Bonn Lynx Expert Group 2021). With the Northern lynx ESB, there is however an important phylogenetic question to be answered: Are the Scandinavian and Fenno-Baltic lynx phylogenetically close enough to be considered an ESU? Until this question is answered, we recommend using only wild lynx from the Baltic population or captive-bred lynx demonstrated to belong to the Baltic or the Karelian populations for any reintroduction or reinforcement in the region of the Baltic lowland lynx (Fig. 2 in Bonn Lynx Expert Group 2021).

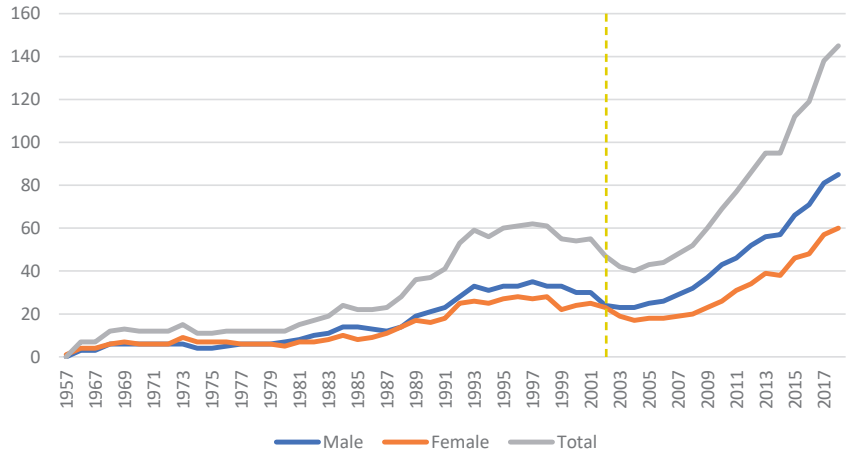

Fig. 2. Development of the EAZA ESB population of *Lynx lynx carpathicus*. Yellow dashed line indicates start of studbook in 2002.

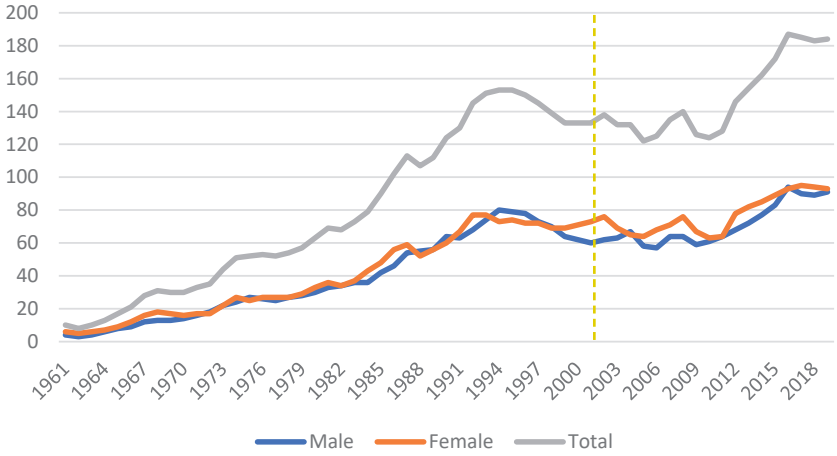

Fig. 3. Development of the EAZA ESB population of *Lynx lynx lynx*. Yellow dashed line indicates start of studbook in 2002.

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