Factors shaping the Eurasian lynx *(Lynx lynx)* population in the north-eastern Poland

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Abstract

The Eurasian lynx living in north-eastern (NE) Poland are on the western-most limit of the natural range of the species and they occupy highly fragmented habitat. Its population range has contracted during the past 20 years in this area. In this review, I considered the effect of different factors on lynx population that may potentially affect its survival and conservation, operating at three levels: 1) habitat (macro-scale - effect on population genetic variability and micro-scale - habitat selectivity), 2) trophic (prey availability) and 3) intraguild interactions (spatial interactions with wolves). Based on microsatellite markers the lynx inhabiting the Białowieża and Knyszyn Forests (NE Poland, fragmented habitat) appeared to have lower genetic variability than those from Latvia and Estonia (continuous habitat). The sampled populations were also highly significantly differentiated from each other with the NE Polish lynx forming a clearly distinct genetic group relative to the two other populations.

The lynx were found to be highly selective towards microhabitat characteristics during hunting and resting. The complexity of the forest composition (a number of structures useful for stalking prey including: fallen logs and branches, root plates, patches of shrubs) and presence of small forest glades (as foraging areas of their prey) were most important features distinguishing lynx hunting sites. The most important characteristic of resting sites was very low visibility that resulted mainly from using young pine or spruce thickets in the winter and dense undergrowth of deciduous forests in the summer.

The decline in prey population (roe and red deer) in the Białowieża Primeval Forest caused the lynx to increase their home range sizes and daily movements. This resulted from increased foraging efforts. Lynx may then behaviorally adapt to changing prey availability, however this is not sufficient in preventing its negative influences on the lynx population.

The lynx and wolf coexisting in the Białowieża Forest utilized habitats to a similar extent, but independently of each other. The individual lynx home ranges and wolf pack territories overlapped each other by up to 76% and no avoidance was detected between lynx and wolf individuals occupying the same areas. It is likely that the two predators may coexist in BPF due to specialisation on different prey and heterogeneous habitat that enables lynx to escape competition with larger wolf.

The research suggests that conservation of the lynx in Poland should focus on: 1) ensuring effective gene flow among nearest neighboring lynx populations by restoring and maintaining the connectivity among them to prevent further loss of genetic variation, but with careful consideration for regional subdivision of population, 2) restructuring the forest stands by modification of management procedures according to specific requirements of lynx, 3) minimizing the harvest of roe and red deer populations in areas inhabited by lynx, prioritizing its dietary needs.

Key words

Lynx, competition, conservation, genetic variability, habitat selection, predator-prey relationship, wolf