



15th INTERNATIONAL GROUSE SYMPOSIUM
September 11-15, 2023, Bialystok, Poland

Is the black grouse (*Lyrurus tetrix*) an indirect victim of the sylvatic rabies eradication by fox vaccination?

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KEY WORDS: black grouse, red fox, rabies, dynamic of populations, predation

INTRODUCTION

Since 2017, a reinforcement program was developed to save the last, endangered, Belgian population of black grouse (*Lyrurus tetrix*), in the High Fens Natural Park. To improve the success of this program, an analysis of past data of this population was undertaken to understand the causes of its past decline. Climate models, applied in previous studies to explain these population trends in the High Fens, failed to describe this major modification in this population's dynamic and its recent decline.

MATERIAL AND METHODS

A time series analysis was applied on the core population to understand the causes of its past decline, using annual spring male census data recorded between 1967 and 2016.

RESULTS AND DISCUSSION

In the period 1967–1993, there was a fluctuation around an equilibrium of a population of ca. 40–45 males. After 1993, the population dynamic changed drastically, decreasing continuously until finally reaching quasi-extinction. On average, the population lost 15.4% of its size each year.

Red fox (*Vulpes vulpes*) populations in Western Europe experienced a significant decline and stabilized at lower densities than observed in the past due to an outbreak of sylvatic rabies. In early 1990s, a fox demographic explosion followed a massive vaccination campaign, and fox populations became larger than had been observed before the epizootic. The eradication of the rabies was not the direct cause of this demographic explosion, as rabies-free areas experienced it also (but earlier). The causes are more to be sought in environmental modifications induced by humans.

Around 1993, the remarkable synchronicity between the beginning of the Black Grouse population decline in High Fens and the fox demographic explosion suggests a significant increase in predation on this bird species. If the fox is singled out for this change in Black grouse dynamics, it should not be concluded that it is entirely responsible for this decline. It is quite possible that other factors have added up, such as the arrival or increase of other predators (the raccoon in particular, but also the wild boar, and better health of the populations of large raptors), deer overgrazing, and other subtle habitat changes and in climate.