Report of Tomáš Telenský's PhD thesis: Impact of Climate Change on Czech Bird Populations

General comments

The thesis consists of 4 chapters focusing on different aspects of climate change impact on Czech bird populations (i.e. wintering conditions, breeding conditions, life-history traits, demographic factors, habitat restriction and range shifting) that provide interesting new insights in the field of climate change research. Three of the four chapters have been published which indicates the high quality of the research done in the thesis. The thesis shows that the PhD candidate has a strong knowledge of climate change processes and how they are expected to affect populations of wild birds.

The methodology is scientifically sound, the statistical analyses are appropriate in order to answer complex research questions, and the study meets the ethical standards (use of monitoring data mainly and standard mist-netting data). The results are presented clearly, in Chapter 4 some tables are missing from the supplementary material though. The results are discussed properly in the chapters. However, it would have been interesting to see a general discussion covering the thesis results, potential follow up questions, the PhD candidate's opinion on what climate change research should be focusing in the coming years, or thoughts of what the results of this thesis may mean more generally for biodiversity (for other organisms and geographic areas).

Three out of four chapters were lead and mainly written by either the PhD candidate supervisor or another collaborator. This highlights that the PhD candidate work focused a lot on data analysis, but other important aspects of research such as setting up research questions, or writing up papers were less tackled by the PhD candidate. The thesis is suitable for the defense and the quality and contribution of the PhD candidate to the research is sufficient to award a PhD.

Introduction

It covers the main information necessary to understand the hypothesis and tests performed in the chapters. However, it is odd to see detailed information on the methods (description of variables used in the analysis and models) and plots in the introduction. Additionally, results are also mentioned in the introduction and are briefly discussed. I expected the introduction to summarize state of the art information on climate change and current hypothesis, and to introduce the chapters briefly, but not to include detailed methods, results, or discuss them.

Conclusions

They are clearly stated and summarize well the main findings of each chapter.

Chapters

The first three chapters have been published and the fourth one has been submitted indicating that the chapters have high scientific quality.

The first chapter is a necessary methodological paper testing the suitability of the data for the subsequent analysis conducted in the following chapters. The chapter is written in Czech, so my impression of it is only based on the English summary.

Second chapter is a comprehensive analysis about the effect of climate change on resident species with respect to their diet and energy expenditure concluding that food-mediated mortality may be more important than direct climate-mediated mortality. I think that it would have been interesting to check other variables related to climate such as number of days with temperatures below zero or with snow coverage to complement this analysis on mean temperatures, as extreme events could explain also part of the variation on population dynamics.

The third chapter focuses on a group of birds particularly vulnerable to climate change and finds interesting and strong negative effects particularly for the species associated with highest altitudes and evidence of range shifting due to climate change.

The last chapter is a detailed analysis about the effects of climate change at different times of the year and on different demographic components. It is a complex innovative analysis reporting novel information. I don't agree with one of the conclusions *"We found that spring climate explained 62% variability of the breeding productivity, whereas AET/PET (moisture) in Sahelian part of non-breeding ranges explains 20% of the variability of the adult survival. Thus, climate on the breeding grounds is more important for migrant species than the climate on the non-breeding grounds"*. I think one can't say whether climate on breeding grounds or wintering grounds is more important for long distance migrants (population dynamics, I assume) with this analysis, because they found correlations to different demographic components. A test to answer this question would be to check the effect of wintering and spring conditions on population dynamics directly. Additionally, although only 20% of the variability of adult survival is explained by conditions in wintering grounds, adult survival has a significant effect on population growth, but not breeding productivity.