A review of the PhD Thesis by Mgr. Jana Vokurková

Dear committee,

PhD thesis of Jana Vokurková deals with bioacoustic analyses of avian communities and species. It deals with two topics. The first is the analysis of bird communities in the tropical forests of Mt. Cameroon. The second is a detailed analysis of singing in nightingales in a hybrid zone between two closely related species. It consists of three chapters that have already been published in respectable journals. In addition, the author added three appendices that are not to be evaluated but that demonstrate her contribution to other problems as a valuable part of larger research teams.

I am happy to report that this thesis presents an original and interesting piece of research. Several of its results are novel and provide important insights into the functioning of tropical communities and species interactions.

Comments to individual chapters:

Chapter 1

At first, I was a bit skeptical and told myself: "Another descriptive study of singing in nightingales!" However, I am happy to report that I was mistaken, and I really enjoyed reading this chapter. Its combination of a detailed bioacoustic analysis of songs with genetic analysis of singing birds provided an illuminating insight into the origin and identity of mixed singers in the zone of overlap between two sister species of nightingales. I really love figures 2 and 4 as they convey the outcomes of this study in such a compact and comprehensible way. Two findings are especially interesting. First, hybrids sing almost exclusively Common Nightingale songs, which makes sense once we learn that they are F1 hybrids of Thrush Nightingale females and Common Nightingale males. Second, genetically clean Thrush Nightingales in sympatry are mixed singers, while Common Nightingales in sympatry sing pure conspecific songs. Unfortunately, this story is incomplete without an attempt at explaining these findings. Some potential explanations are tested in the Appendices, which are not, however, an official part of the thesis, and thus the topic remains open and unresolved within the scope of the PhD thesis itself (including its Introduction).

Chapter 2

This is a well-crafted methodological study comparing direct point counts and analyses of automated recordings of tropical communities of Mt. Cameroon. It shows that automated recordings of bird songs and sounds can be a valuable approach to quantifying community composition in a difficult environment of the tropical rainforest. However, to obtain even more robust and informative results, I would have preferred if two observers analyzed the song recordings independently. This could potentially show that any experienced observer can generate reliable data on tropical bird communities and would not be contingent on a particular observer analyzing recordings in this article. Moreover, it was also unclear to me what recommendations the authors gave to other researchers, especially in terms of sampling design. The reliability of acoustic samples decreased with the density of species and with the distance from the microphone. Should we use this method for common species? Can we use it only for birds vocalizing close by the microphone?

Chapter 3

This study shows that birds vocalize less during full rainy season in the tropical forest of Mt. Cameroon. It is well designed, conducted, analyzed, and presented. All controls for sampling intensity and potential other biases I could think of were used, so I am confident that the results presented are real and robust.
One thing that is lacking, and which the authors actually mention, is splitting species according to their foraging and food preferences. I am unclear why this aspect was not included, but it could provide very illuminating insights into potential differential timing of reproduction of, for example frugivorous versus insectivorous species. It could also answer some of the questions the authors pose in Discussion (e.g., on potential mechanisms driving the timing of singing activity).

A critical reader might notice that it seems to be a drawback of this thesis that it is a bit outdated. Its chapters have been published some years ago and its Introduction (pp. 11-18) does not update us on latest findings in the

field. I would love to know, for example, what is the current, state-of-the-art approach to acoustic monitoring of avian communities in difficult tropical conditions. How reliable did it turn out to be in general? Can we perform large-scaler monitoring studies of avian communities using cheap audio-recorders? Does the reliability differ across different environments? Do we still need human observers or is at least some automation possible? Were there further studies of the seasonality of singing in tropical communities? With what results? Etc.

However, I think that this thesis has its strong merits and provides interesting and informative contributions to the field of avian ecology via a lens of bioacoustic analysis. I thus believe that it is a good basis to grant to its author the degree of the Doctor of Philosophy at Charles University.

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