



Opponents's review on the master thesis “Vocal individuality in yellow-rumped tinkerbirds (*Pogoniulus bilineatus*)”, author of the thesis Siddharth Prashant Khopkar

The master thesis focuses on a very interesting topic of vocal individuality in calls of the yellow-rumped tinkerbird (*Pogoniulus bilineatus*). Specifically, the thesis investigates (1) whether there are individual signatures in acoustic structure of calls, (2) whether the signatures are stable, i.e., whether the calls of individual birds are discriminable after some time period, and (3) whether the acoustic distances correlate with geographic distances.

The thesis is brief and fully complies with the required format of scientific article. The author analysed sufficient amount of calls recorded from 18 individuals from Cameroon (subspecies *P. b. leucolaimus*) and 10 individuals from South Africa (subspecies *P. b. bilineatus*). The author tested his hypotheses and assumptions using appropriate statistical methods commonly used to address the topic of individual signatures in animal calls, differences between populations and relationship between acoustic and genetic distances (discriminant function analysis, Beecher's statistics, t-test, Mantel test, etc.). Let it remain to be a potential topic to a discussion during the master thesis defence, why the author, when testing for population and individual differences, did not use other applicable tests, e.g. general linear models, ANOVA. Overall, the master thesis has a quality that definitely makes it appropriate for a successful defence as the author was able to deal with the topic very professionally. However, the work has some serious shortcomings that should be fixed before one can consider its submission to a scientific journal.

The Introduction lacks some important information that is necessary to mention with respect to that the thesis deals not only with individual signatures, but also population differences and the relationship between acoustic and genetic distances. Therefore, introduction to intra-species variability and evolution of acoustic signals would be appropriate. Some paragraphs or sentences are highly general and basically do not lead the reader to better understand the topic and the situation in the study species or non-passerine birds. Some formulations seem to be inaccurate, e.g., page 1, “*The production and transmission of these acoustic signals vary in groups of animals*” – could be “*animal taxa*”; page 2, “*For some individuals it has been possible to visually identify them ...*” – could be “*For some species, it is possible to identify the individuals ...*”).

The first paragraph in Methods lacks any reference and it is not clear which source was used to extract all the information about the study species (its distribution, morphology, ecology, diet, acoustic signals). Possibly, it could be also stated in this paragraph that the species is polytypic, because later it is mentioned that two studied populations correspond to two subspecies. Additionally, the Methods lack some important information considering data collection. It is not clear how it was ensured that different individuals were recorded. I suppose that in such a sedentary bird, same locations equal same birds. However, this is not stated in the Methods. There is also no information on the distance which was used to ensure that different territories are visited. Moreover, there is no information on whether only males produce the calls, thus it is not clear how singing males and females were eventually distinguished (the author state that both sexes are morphologically similar). Statistical methods are described in a very brief way. However, at least in the case of the Beecher's information statistics, the author could describe more clearly that it can be used to estimate the number of individuals that can be potentially discriminated based on acoustic structure in their calls.

The author state in the discussion that the relationship between acoustic and genetic distances was investigated on a small geographic scale. Therefore, I find it problematic that the Methods do not include information on the smallest, largest or average distance between all the sites where the yellow-rumped tinkerbirds were recorded. Eventually, a map showing all the site locations could be useful.

Finally, taking in the account that the author was not overwhelmed by a large amount of text, it makes no sense that the thesis contains a lot of unnecessary, more or less serious shortcomings. The thesis does not have a standard text formatting, e.g., there is a different heading format in the Introduction and Methods. There are also many typos and stylistic errors. In the Results, the figures 4 and 5 seem to be swapped. Last but not least, p-values in Results could be presented in a more standard way.

As a result, I evaluate the thesis as *very good* (2) and also have two questions for the author:

(1) Author describes the calls of the yellow-rumped tinkerbird as a song. On the other hand, he clearly demonstrates that it is a very simple call consisting of several highly uniform syllables. I am not expert on bird vocalizations, however, as far I know, the term *song* is usually used for highly complex bird or mammal vocalizations. Therefore, I'm just interested whether the term *song* is indeed used in such a vague way in the literature on bird vocalizations.

(2) The author states that the Beecher's information statistics (HS) was 2.6 bits. As far I'm familiar with this method, this means that six individuals could be potentially discriminated based on acoustic structure of their calls (2^{HS}). From a biological perspective, isn't that enough for a sedentary territorial bird, which may have only few neighbours surrounding its territory?

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