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Review of Adéla Petrželková's PhD thesis « Conspecific brood parasitism : a case study on the common pochard and the barn swallow ».

Mrs Petrželková presents a thesis on the processes of conspecific brood parasitism in birds, through studies of this behaviour in Common Pochard (*Aythya ferina*) and Barn Swallow (*Hirundo rustica*). Nest parasitism, by which a bird female lays eggs into another female's nest, is a breeding strategy reported from a variety of species, from which the parasitic female can expect producing some offspring while skipping many of the costs of reproduction during brooding and chick-rearing phases. The situation can be complicated by the fact that the parasitic female may be fertilized by the social male of the parasitized nest, a situation under which these two individuals may gain breeding output at the expense of the official nest mother.

The thesis is composed of a thirteen-page introduction with 117 references, four scientific papers in the main body of the document plus two additional scientific papers as appendices. Mrs Petrželková is the first author the four main papers, three being already published in international journals and one of unknown status (has it been submitted?). She is a co-author in the two appendix papers, which are both published.

From the scientific production above, some of the published paper being in very good scientific journals, the author has demonstrated her abilities and skills as a researcher. With three papers published as first author, she also fulfils the requirements of Univerzita Karlova for a PhD thesis.

Clearly, Mrs Petrželková has done a good job in her study of conspecific brood parasitism in birds: the introduction shows she masters the general theoretical background and reference literature, and the quality of each published paper provides useful information for the scientific community. She has successfully used a variety of methods in the field and in the lab, and the statistical analyses are adequate and nicely presented. I have some minor comments on papers 1-3, listed below, and more points on paper 4. My main point, however, is with the general text of the thesis (the initial 13 pages): while this provides a good introduction, states the main aims of the study and summarizes the results of each paper nicely, it does not really show how the four papers complement each other, does not explain why two different species were used here and, more importantly, does not provide any general and comprehensive interpretation of the results. Beyond the core results of each chapter taken separately, which are really good, how they are connected to each other and how they collectively build up as a new general theoretical knowledge, point to required future research, and provide new information about these species general ecology is not really addressed. This is particularly a pity considering the Common Pochard, whose populations do not fare well at present, with a decrease in breeding success being considered among the factors causing such population declines: do the results of this thesis have any conservation implications for the species?

I really think those points deserve a proper explanation and discussion with the jury during the defence.

Paper 1 has already been published in a scientific journal and, as such, has already been evaluated by peers and scientifically validated. I therefore have no particular problem with the writing and the general conclusions. Protein fingerprinting was nicely used to evaluate the rate of nest parasitism in common pochard nests, the number of parasitic females per nest and clutch size in the various situations (parasitized / non-parasitized nests). These are all important parameters to know. I only wondered how you can state that you located the nests of about 50% of the population? How do you know? This is crucial in such studies, and I will come back to this later regarding paper 4. In practical terms, I was surprised by the layout of Figure 2: because you try to explain the number of parasitic eggs I think the X and Y axes should better have been inverted.

Paper 2 has also been published already, and in a very good behavioural journal. I was very interested by the results about distance between own and parasitized nests, and by the strategy of social males, potentially cooperating with parasitic females. This is a very interesting point, with far-reaching implications in terms of evolutionary ecology. Very heavy fieldwork and a good mastering of statistics to bridge genetic and behavioural results were shown here. I greatly appreciated the demonstration of increased potential fitness of the females under the parasitic strategy compared to regular breeding, and the fact that only the host female pays costs under the quasi-parasitism strategy.

Paper 3 was another good publication as first author. The authors test the results of a field technique to differentiate eggs based on morphometrics, and demonstrate via a genetic tool that this may not be very accurate to identify parasitic eggs in a nest. Beyond this relatively technical result, the paper also demonstrates a greater MED in more related females, i.e. would seem to reject the hypothesis of heritable egg characteristics. This was very counter-intuitive, and should motivate future studies. In the thesis introduction, the author describes the Eadie's technique and its possible uses, writing that it has the advantage of being possible to use on museum specimens. However, I believe most eggs are emptied before entering museum collection, so egg weight would not be available for those. Further, DNA analyses should be possible to perform even on very old eggs from museum collections, so combined with the present results showing that the Eadie's method may not be entirely reliable for Common Pochard, shouldn't it be completely abandoned for this species, and genetic analyses be preferred in all cases (i.e. historic and modern eggs), even if more expensive?

Paper 4 was the only chapter of the thesis not being published at reading time. It would have been interesting to know the current status of this manuscript: has it been submitted yet? I liked the diachronic approach, by which the strategy of the same female was compared between years, and found it most interesting that the same individual may rely on different parasitic/non-parasitic strategies over successive breeding seasons. This however lies on the assumption that the strategy of each individual could be properly ascertained, and the authors failed to convince me about this: to be able to tell that a female is purely parasitic, one must ascertain that it does not have an own nest anywhere. Similarly, if a female laid parasitic eggs in a nest that failed to be found, it would be wrongly considered as a non-parasite individual. The paper is not entirely clear about this, especially when the authors acknowledge on lines 226-227 that only a part of the population was sampled, then lines 234-235 that they found the absolute majority of the nests in the area. This deserves clarification during the defence. It was interesting to read that individual females changed their strategy from year to year, while the relative proportion of individuals relying on each strategy did not differ significantly from a breeding season to the next. The latter would suggest that strategies are therefore not strongly affected by environmental conditions, or these conditions remained fairly stable in the study area. But why then would some individuals switch strategies? I believe one natural follow-up study to this one would be to catch the breeding females on their nest, and try relating their breeding strategy to their individual body condition, age, parasitic load, or else...

I was somewhat surprised by the topic of the two papers presented in the appendices: they are both published in very good journals, but deal with scientific subjects that are completely unrelated to the PhD thesis (or at least the student failed to explain why they could have been so), and unrelated to each other. I agree that they show the student was able to join successful research teams and contribute

to the production of science of very high quality, but did not see how they otherwise added anything to the research project of Mrs Petrželková, and should thus be included in her thesis.

To conclude, I congratulate the student for the quality of the research she conducted, which makes the thesis a valuable piece of scientific work: as such this deserves to be defended in public and is also suitable for award of a PhD.

Done in Arles, 26 May 2017

A handwritten signature in blue ink, consisting of several overlapping, fluid strokes that form a stylized, abstract shape.

Matthieu Guillemain

