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June 3 , 2021

Evaluation of Doctoral dissertation submitted by Anna Mácová

It is my honour to provide an evaluation of doctoral thesis entitled “**Apodemus vs. Eimeria: Evolutionary factors of speciation and genomic diversification in host-parasite system**” by Anna Mácová, supervised by dr. Jana Kvičerová. The study addresses one of the most diversified group of parasitic protists: the monoxenous coccidia and evolution of their diversity and host specificity.

The study is based on 5 published papers (Anna is a first author in one of them), with addition of two further MS. The examined parasite-host system is comprehensively introduced and explained in two initial chapters (1. Introduction and 2. Studied host-parasite system). The objectives of the study aimed mainly at *Eimeria* spp. in the European species of the genus *Apodemus*, with last objective being more general. Part 4 (methods) gives very brief overview of applied methodologies and I appreciate its very minimalistic form. Part 5 (Results and discussion) provides comments on all seven papers included and part 6 (called Summary) provides discussion on interesting aspects of host specificity of rodent *Eimeria* in broader context. I have to say, that I felt a bit sad that this last part was so short, because I found it truly interesting... but such is life.

Anna is apparently an active researcher with broad range of interests and nice publications. I understand, that it is always a dilemma which papers to include into the final “thesis”. For me, and it is only my personal opinion, the paper on *Microtus mystacinus* in Kazakhstan and general study on parasitofauna of mammals in Svalbard (MS3 and MS4) are a bit redundant. They are nice and interesting, but they really does not fit into. Rather, I would appreciate seeing them as a nice “addition” to the author’s scientific CV. Their including does not make study weaker, but it also does not make it stronger... only less coherent.

The fact, that great majority of the results was already published in renowned journals makes the work of reviewer very easy and very difficult in the same time. So I carefully checked the remaining two draft and found also those very well prepared. The draft No 1 brings high amount of data that can be potentially used for a debate on the “species concept” in the *Eimeria* and related

terminology... (I will be back to this topic in Questions part). The draft 2 opens another Pandora box, namely *Eimeria* of insectivores.

To make a long story short: it is my pleasure to conclude, that thesis of Anna Mácová merits the acceptance as a doctoral dissertation as it fully meets the requirements for such a study.

I would like to ask at least few questions that can be answered later during the defence:

Q1: In many of your trees depict the polyphyletic character of the genus *Eimeria*, even if we consider this genus in its narrow sensu stricto meaning. Is it still OK to consider *Eimeria* as a genus? Or, in other words, should we give up and not try any more to make the taxonomy at the genus level being congruent with molecular phylogenies?

Q2: The study seriously challenges not only the taxonomic approaches based on morphology, but also usage of "common" genetic markers like *cox1*. Does this mean we are facing the end of taxonomy and species descriptions? Is there any value in the names given previously? And, finally, is there any way how to name species in the future? What is the new "species concept" in case of *Eimeria*? For instance you commonly use *Eimeria alorani* the way, that one can have impression that it is a "species". However, it is not clear to me if this really incorporates the fact, that it was described in the Near East from other species of *Apodemus*. So, is this "a species" or rather a "morphotype"?

in Brno 3/6/2021

A handwritten signature in blue ink, appearing to read "David Modrý", with a long horizontal stroke extending to the right.

Prof. MVDr. David Modrý, PhD