



Přírodovědecká fakulta  
Faculty of Science

Jihožeská univerzita  
v Českých Budějovicích  
University of South Bohemia  
in České Budějovice

## STATEMENT OF THE BACHELOR THESIS REVIEWER

**Name of the student:** Hana Pechová

**Thesis title:** Characteristics of the mitochondrial genome of the roundworm *Oscheius myriophila* (Rhabditidae)

**Supervisor:** PaedDr. Martina Žurovcová, Ph.D.

**Reviewer:** RNDr. Magda Zrzavá, Ph.D.

**Reviewer's affiliation:** University of South Bohemia in České Budějovice, Faculty of Science, Branišovská 1760, České Budějovice, 37005

Point scale<sup>1</sup> Points

### (1) FORMAL REQUIREMENTS

<b>Extent of the thesis</b> (for bachelor theses min. 18 pages, for masters theses min. 25 pages), <b>balanced length of the thesis parts</b> (recommended length of the theoretical part is max. 1/3 of the total length), <b>logical structure of the thesis</b>	0-3	3
<b>quality of the theoretical part (review)</b> (number and relevancy of the references, recency of the references)	0-3	2
<b>Accuracy in citing of the references</b> (presence of uncited sources, uniform style of the references, use of correct journal titles and abbreviations)	0-3	2
<b>Graphic layout of the text and of the figures/tables</b>	0-3	3
<b>Quality of the annotation</b>	0-3	2
<b>Language and stylistics, complying with the valid terminology</b>	0-3	3
<b>Accuracy and completeness of figures/tables legends</b> (clarity without reading the rest of the text, explanation of the symbols and labeling, indication of the units)	0-3	3
<b>Formal requirements – points in total</b>		18
<b>(2) PRACTICAL REQUIREMENTS</b>		
<b>Clarity and fulfillment of the aims</b>	0-3	3
<b>Ability to understand the results, their interpretation, and clarity of the results, discussion, and conclusions</b>	0-3	3
<b>Discussion quality – interpretation of results and their discussion with the literature</b> (absence of discussion with the literature is not acceptable)	0-3	2
<b>Logic in the course of the experimental work</b>	0-3	3
<b>Completeness of the description of the used techniques</b>	0-3	3

<sup>1</sup> Mark as: 0-unsatisfactory, 1-satisfactory, 2-average, 3-excellent.

Experimental difficulty of the thesis, independence in experimental work	0-3	2
Quality of experimental data presentation	0-3	3
The use of up-to-date techniques	0-3	3
Contribution of the thesis to the knowledge in the field and possibility to publish the results (after eventual supplementary experiments)	0-3	3
Formal requirements – points in total		25

**POINTS IN TOTAL (MAX/AWARDED)**

**43**

The aim of the bachelor thesis was sequencing and annotation of the mitochondrial genome of a nematode *Oscheius myriophila* and use it for phylogenetic analysis in order to determine relationship with other selected species. The author managed to sequence most of the mitogenome using simple yet adequate approach and used it for reconstructing the phylogeny of selected nematodes. Thus the aims of the study have been successfully fulfilled. The text itself is quite nicely written, although there is still some room for improvement, e.g. the discussion part and using references.

**Suggestions and questions, to which the student has to answer during the defense:**

#### Comments

- Number of mitochondria per cell in animals in larger, usually hundreds or thousands (see e.g. Cole 2016 (doi.org/10.3389/fcell.2016.00085))
- I would have omitted the paragraph on the page 6 starting "As the identification ..." on *Caenorhabditis elegans* being the model organism. I believe it is irrelevant for the thesis. Moreover, the author states that "In those it has been shown, that *C. elegans* is even more powerful genetic model because of its hermaphroditic reproduction, fast production of homozygotes and its short life. These features make *C. elegans* an appropriate organism for analysis of phenotypic variations within phyla." I agree that short life cycle is an advantage for genetic studies, it has, however, some unpleasant consequences not known before the onset of NGS. Massive genome sequencing of non-model organisms from all metazoan clades revealed that genomes of *Drosophila* and *Caenorhabditis* have unusual organization and synteny, which is conserved between basal metazoans as well as vertebrates, do not apply for these two (e.g. Shrivastava et al. 2008 doi:10.1038/nature07191). Further, hermaphroditism in *C. elegans* says nothing general about nematodes, since it had evolved multiple times independently in nematodes, and even in the genus *Caenorhabditis* most species are gonochoristic and hermaphroditism evolved twice independently (Kiontke 2004, doi: 10.1073/pnas.0403094101).
- Sometimes there are missing references (e.g. in the last paragraph of the first Introduction chapter), or they are old, although there are newer relevant papers which are not mentioned. For instance, there are newer phylogenies of nematodes than Poinar 1993 (e.g. van Megen et al 2009 doi:10.1163/156854109X456862).

Questions:

- How did you select species for the phylogeny?
- Are there more nematode species with sequenced mitochondrial genomes?

Minor comments

- The following sentence in chapter 5.8 should be rephrased: "This observation is in contradiction with Blaxter et al. (1998) who has determined that *Oscheius* species share a common ancestor with *Heterorhabditis*, while *Caenorhabditis* species do not, meaning that *Oscheius* genus might be more distant". Since all species under study share a common ancestor, I would rather say that *Heterorhabditis* branched off first, thus mentioning a common ancestor can be avoided.
- Page 5: The sentence "Beyond the morphological and ecological similarities, it has been proved that both groups (Heterorhabditidae and Steinerematidae) evolved independently from two common ancestors (Poinar 1993)" is quite misleading, since clearly both families had a common ancestor at some point. I believe the author wanted to say something like this: "Based on current phylogeny (reference) entomopathogenesis has evolved in both families independently."
- I recommend using smaller font for figure legends, so they could be easily distinguished from the main text.
- Page 6, first line: I believe the author wanted to use the term "rhabditid" rather than "Rhabditis", since family is a taxonomic rank superior to genus, thus the genus *Rhabditis* cannot be divided into two families.

Conclusion:

In conclusion, I


r e c o m m e n d

the thesis for the defense and I suggest the grade 1 or 2 depending on the performance during the defence.

In České Budějovice

date

16. 6. 2017



signature