



Confidential

Review of USB FFPW PhD Thesis

First name(s), surname, titles of the PhD student: Kseniia Pocherniaieva, M.Sc.	First name(s), surname, titles of supervisor: Dipl.-Ing. Vojtěch Kašpar, Ph.D.
Title of PhD thesis: The foundation of maternal factors in sturgeon: from oocyte to embryo	
REVIEWER:	
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Please describe your professional relationship to the PhD student: none	Please describe your field of expertise: biology of fish reproduction, cryobiology

QUESTIONNAIRE

Originality, scientific importance, perspectives and impacts of results presented in the PhD thesis for basic and/or applied research

Evaluate competitiveness of the PhD thesis in the international context and compare its level with the current state of the art in the field (**extent ¼ – ½ page**):

The nature of this dissertation is primarily of basic research as it characterizes biological processes that are not commonly used in aquaculture. Nevertheless, the findings of this research can serve as a good background for downstream application in sturgeon reproduction. The results described in the dissertation are obviously original, although, – as the text itself suggests – previous observations made in *Xenopus* forecasted the findings of the study. The greatest strength of the dissertation lies in the fact that sound scientific hypotheses were formulated by a careful analysis of previous findings and these hypotheses were later confirmed. Its weakness is similar to its strength: no surprising findings, every experiment yielded the expected result.

Elaboration of the PhD thesis, objectives of the work and deliverables

Evaluate the overall level of elaboration of the PhD thesis (structuring of the main text, comprehensibility, logicity of the chapters and their ordering) and the originality of the selected approaches to solve the objectives; evaluate publications and whether the results described correspond to objectives of the PhD thesis (**extent ¼ – ½ page**):

The dissertation is very well-structured as is usual from this school. The document consists of 72



pages, including a general introduction, two chapters which are basically two papers published by the applicant as the first author, and a last chapter. This last one includes the general discussion, summaries and other appendices. The dissertation follows a logical order giving a general introduction into sturgeons as well as into oogenesis and embryogenesis in sturgeons. The two papers follow suit, each one dealing with a specific question such as the identification of oocyte-specific mRNA in sterlet eggs and the other one discussing maternal to zygote transition as well as mid-blastula transition in sturgeon. The general discussion seems to repeat the findings discussed in the two papers as well as in the general introduction, thus, it is a bit disappointing, however, the conclusions give the reader a good guidance into the contents of the dissertation. Overall, this is a very well-constructed, easy-to-read thesis work.

OVERALL COMMENTARY ON THE PhD THESIS

Please write comments in extent of 1-2 pages:

I was reading the thesis work of Kseniia Pocherniaieva with great expectations because the topic of the dissertation is definitely a very acute one. Research in reproductive biology in the beginning of the 21st century cannot be imagined without investigation of epigenetic factors, maternal (or paternal) effects that control embryogenesis and even subsequent ontogeny. Thus, addressing a very important and actual topic is without doubt a strength of the dissertation. Reading it was also easy due to its structure and its brevity. Also, the methods used in the papers (especially the one on MBT) reflect ingenuity and originality.

On the other hand, the dissertation is short and predictable. The backbone of the thesis consists of only two papers. After reading the general introduction, no surprises are left for the reader in the papers. Yes, embryogenesis of sturgeons is very similar to that of amphibians, more specifically anurans. The general introduction describes the background knowledge on this in great detail and the two papers basically confirm what has already been known, using a more modern approach identifying genes. The general discussion adds little to what has already been discussed in the papers and unfortunately repeats what has been described in the introduction – a typical mistake that authors are generally warned against. Finally, the quality of English in the general introduction and discussion is poorer than what is expected from this school.

Detailed remarks:

- The dissertation that I have received lacks page numbering. This makes reviewing difficult.
- The Table of Contents is oddly numbered as Chapter 3 is followed by Chapter 7. Chapter numbering in the dissertation itself is correct.
- In section „1.2 Sturgeon“ the applicant describes (and unfortunately repeats almost word by word in the general discussion) the ploidy of various species of sturgeon. I understand, that the shortnose stands out as a species with a uniquely high number of chromosomes and amount of DNA, however, I have read that the green sturgeon (*A. medirostris*) has a similarly high chromosome number. Can the applicant confirm this?
- Section 1.2 contains a long paragraph describing the status of sturgeon species and stocks in the world. As the dissertation itself is very marginally aquaculture- or fisheries-related this paragraph could significantly be shortened. Also, the literature cited here is obsolete as



the most recent one is from 2011. Sturgeon aquaculture grew out of nothing very rapidly and things that were true in 2011 are no longer valid. Most caviar today comes from aquaculture whereas back in 2008-2010 there were mostly capture fisheries.

- In the section „1.3 Germplasm and primordial germ cells” a much more detailed description of the germplasm is missing. There is a short paragraph at the end of this section, however, this unique structure would have deserved more attention, especially that the entire Chapter 2 is dedicated to the isolation of RNA in the germplasm of the oocyte.
- How does the applicant explain the observation in Chapter 3 that the hybrid sturgeon embryos transitioned from synchronous to asynchronous division one cell cycle earlier than sterlet embryos? I have not found a plausible explanation of this phenomenon in the Discussion section of the published paper.

FINAL RECOMMENDATION

- PhD Thesis can be recommended for defence**
 PhD Thesis can be recommended with reservations for defence
 PhD Thesis can not be recommended for defence

6th July, 2020, Budapest, Hungary


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Prof. Ákos Horváth PhD