



Review of USB FFPW PhD thesis

First name(s), surname, titles of the PhD student: Martin Hubálek, Dipl.- Ing.	First name(s), surname, titles of supervisor: Prof. Dipl.-Ing. Martin Flajšhans, Dr. rer, agr.
Title of PhD thesis: Polyploidization capacity of sturgeons and its influence on fitness	

REVIEWER:

Surname: Ráb	Institution: ÚŽFG AV ČR
Name: Petr	
Titles: Prof. Dipl.-Ing., DSc., dr. h. c.	E-mail: Rab@iapg.cas.cz
Please describe your professional relationship to the PhD student: none	Please describe your field of expertise: fish cytogenetics and cytotaxonomy as well as problems of fish polyploidy including sturgeons,

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 problems associated with ploidy and hybrid diversity in sturgeons is very important and exciting issue of contemporary biology not only of fishes but in general. Submitted PhD Thesis are therefore very up-to date and valuable contribution to this field. Thesis consists of three published papers and one ready-to-publish manuscript (of very high quality). I appreciate that published papers appeared in (traditional) publishing houses not suspected to be “predatory” ones, which itself guarantees very high standard of review processes. This fact, of course, limits the reviewer’s opportunity to analyze the content of those papers in detail as qualified reviewers did it. The review of introductory part is provided bellow. The topics of published papers are very relevant to research on polyploidy in fishes (Chapter 3) and especially sturgeons (all others) providing new important data and observations. Ready-to-publish manuscript examines in detail swimming capacity and physiological characteristics in induced polyploid individuals and hybrids of two species with different ploidy level. In general, content of Thesis is actual in international context and significantly contributes to knowledge especially to various (e.g. physiological, etc.) characteristics of both natural and induced polyploid sturgeons. Moreover, some aspects of Thesis has direct applied use in aquaculture and sturgeon farming.



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):

At formal level, Thesis are very well and logically organized, clearly structured and text is carefully formulated in tractable English, especially from Part 1. 3 onward. However, previous general Parts possess some small inconsistencies and awkward formulations, which one can understand – to introduce the complicated and complex problems of polyploidy in general in such a limited space is not easy. Anyhow, I feel that deeper attention should have been paid to these parts. One example of mistake: *Some groups of fishes appear to be especially prone to polyploidization, such as those occupying early diverging branches of ray-fin phylogeny, and among teleosts particularly the Ostariophysi.* Ostariophysi is not formal taxon but denomination of evolutionary grade and consists of two main lineages lob-finned fishes (= lungfishes, coelacanths and tetrapods) and ray-finned fishes (5 lineages = bichirs, sturgeons, gars, bowfin and teleosts!). Other small problem includes the irregular usage of plural and singular of term fish/fishes – plural must be used if more than one species is considered. Another aspect is using a bit older references and not more ones that are recent. *Example: It is not too surprising that the highest number of evolutionary polyploid fish species – over 400 – could be found in the species-rich subfamily Cyprininae (Arai, 2011).* Yang L, Sado T, Vincent Hirt M, Pasco-Viel E, Arunachalam M, Li J, et al. Phylogeny and polyploidy: resolving the classification of cyprine fishes (Teleostei: Cypriniformes). Mol Phylogenet Evol. 2015;85: 97–116 provides much detailed overview of the topic. There are some cases of such usage but I do not consider it is important because from General introduction is evident that applicant is more than familiar with problems of sturgeon polyploidy and especially parts from 1.3 are really detailed and excellent.

Some minor problem is awkward English wording in some places and/or using inappropriate term (e.g. connected instead of associated).

OVERALL COMMENTARY ON THE PhD THESIS

Please write in the box specific comments concerning the PhD thesis in extent of 1-2 pages:

I have no specific comments as my positive opinion is expressed above. However, one important aspect is missing in General introduction – comparison of polyploidy in sturgeons (Acipenseridae) and paddlefishes (Polyodontidae). This aspect was very briefly touched in one sentence: This theory was also corroborated by Symonová et al. (2017), who studied the karyotype of American paddlefish using a combination of karyological and molecular cytogenetic markers and distinguished chromosome quadruplets or pairs as labelled with different markers. This transient state on the rediploidization way from whole-genome duplication towards diploidy is called mesopolyploidy. In studies of V. Trifonov, this phenomenon is called “segmental polyploidy”. Therefore, I would like to ask applicant to discuss more in detail this problem of mesoploidy or segmental polyploidy or generally problems of rediploidization of polyploid genomes during defense of Thesis.

In conclusion, I consider these Thesis very valuable and important contribution to research of



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sturgeon polyploidy. I recommend it for defense, which I believe will be successful.

FINAL RECOMMENDATION

- ☒ **PhD thesis can be recommended for defence**
- ☐ **PhD thesis can be recommended for defence with reservations**
- ☐ **PhD thesis cannot be recommended for defence**

Liběchov 23. 6. 2022
Date and place

Petr Ráb
Name and signature