



Review of USB FFPW PhD thesis

First name(s), surname, titles of the PhD student: Marek Let, Dipl.-Ing.	First name(s), surname, titles of supervisor: Assoc. Prof. Dipl.-Ing. Martin Bláha, Ph.D.
Title of PhD thesis: Communities of aquatic macroinvertebrates affected by human activities	

REVIEWER:

Surname: Rulík	Institution: - Přírodovědecká fakulta Univerzity Palackého, Olomouc
Name: Martin	
Titles: doc. RNDr, Ph.D.	E-mail: martin.rulik@upol.cz
Please describe your professional relationship to the PhD student:	Please describe your field of expertise:

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 thesis deals with the impact of various anthropogenic activities on the macrozoobenthos of our streams. The topic is quite topical, because in addition to the classical types of pollution, such as treated and/or untreated runoff from wastewater treatment plants, pesticide pollution from agricultural activities, etc., aquatic ecosystems and their organisms are exposed to new factors, such as the presence of non-native species. Ongoing climate change may in many cases exacerbate or amplify these impacts of human activities on aquatic ecosystems. Recognising the key factor undermining the integrity and functioning of aquatic communities is often very difficult, if not impossible. Similarly, attempts to simulate natural conditions in a laboratory setting often lead to inevitable simplifications that do not provide fully adequate information about the real environment.



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):

This thesis is based on 3 publications, 2 of which deal with the impact of different types of pollution in combination with hydrological drought on the composition of the macrozoobenthos, while the third deals with the interesting phenomenon of the effect of a non-native crayfish species on the abundance, distribution and behaviour of two epibionts of the order Branchiobdellida. The dissertation is written in English and consists of 5 main parts, the sequence of which is, in my opinion, not quite ideal. The attached publications consist of 2 papers already published in journals with a non-zero impact factor (Water and Biology), the third attached paper is in manuscript form for now.

OVERALL COMMENTARY ON THE PhD THESIS

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

Chapter 1 General introduction

I consider the introduction of the thesis to be very successful - the research is well written and with the help of relevant citations allows the reader to understand the studied issue without any problems. Although the theoretical part is quite broad and the author deals with many aspects of the impact of human activities on aquatic ecosystems, I missed at least basic information:

(1) on the impact of dam construction and operation on invertebrates in streams - this issue is closely linked to the alteration of hydrological regime (see River discontinuity concept and e.g.:

Hauer, F.R., Stanford, J.A., & Ward, J.V. (1989). Serial discontinuities in a rocky mountain river II. Distribution and abundance of Trichoptera. *Regulated Rivers: Research and Management*, 3, 177–182.

Stanford, J.A., & Ward, J.V. (1989). Serial discontinuities in a Rocky Mountain river. I. Distribution and abundance of Plecoptera. *Regulated Rivers: Research and Management*, 3, 169–175.

Munn, M.D., & Brusven, M.A. (1991). Benthic macroinvertebrate communities in nonregulated and regulated waters of the Clearwater River, Idaho, U.S.A. *Regulated Rivers: Research & Management*, 6, 1–11

(2) further, crucial information related to stream drying (e.g. Datry et al., 2017 - Intermittent Rivers and Ephemeral Streams: Ecology and Management). The topic is included in the 2 attached papers, so in my opinion would merit more detailed elaboration within this theoretical introduction. At a minimum, references to recent publications on the topic:

Boulton AJ (2003) Parallels and contrasts in the effects of drought on stream macroinvertebrate assemblages. *Freshw Biol* 48(7):1173–1185

Crabot J, Polášek M, Launay B, Pařil P, Datry T (2021): Drying in newly intermittent rivers leads to higher variability of invertebrate communities. *Freshw Biol* 66(4):730–744



Matthaei CD, Piggott JJ, Townsend CR (2010) Multiple stressors in agricultural streams: interactions among sediment addition, nutrient enrichment and water abstraction. *J Appl Ecol* 47(3):639–649.

This introductory chapter includes the aims of the dissertation and a review of the literature used. The aims of the actual research are formulated in general terms, lacking the formulation of any working hypothesis(es).

The citation of some sources, especially book sources, is not accurate - see e.g. Helešic et al. (2014a,b), Štěrbá (2008) - the editors listed actually have nothing to do with the work at all...

Chapters 2-4 consist of publications where the PhD student is first author in two cases and co-author in one manuscript. With the exception of the last one, which has not yet been submitted, the remaining two papers have certainly been properly reviewed in peer-reviewed journals, so I have no comments on them.

Chapter 5 *General discussion*

In this section, the author discusses the results of his research in the context of existing publications. However, since the main results of the work are only at the end of the whole dissertation (English and Czech summaries), the reader has no idea what the author is actually discussing. Also, the use of the term noble crayfish without giving the Latin name does not really appeal to the reader, even though he is familiar with our crayfish species. Therefore, I suggest that the structure of the whole dissertation be changed so that the introductory theoretical section is followed by a chapter of objectives and hypotheses, a brief outline of the methodology, a summary of the main results, discussion and conclusions. Conclusions on page 102 is not a conclusion, but more or less a summary. A main purpose of the conclusion is to provide a new perspective based on the data and analysis and explain the research's significance as a new addition to already existing knowledge. An integral part of the conclusions is usually an assessment of the shortcomings of the work and challenges for future research.

Conclusion (Final evaluation):

Marek Let proved his ability to set up experiments and soundly evaluate and interpret the results obtained from these experiments. However, the manuscript of the dissertation itself does not have the usual structure of individual chapters, which causes some complications for the reader. Therefore, I recommend that this version be edited according to the above recommendations and, after revision, the thesis can be accepted for the defence, and after successful defence to award the title of Ph.D.



Fakulta rybářství
a ochrany vod
Faculty of Fisheries
and Protection
of Waters

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice
Czech Republic

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

Olomouc, August 3th, 2022

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Date and place

Martin Rulík

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Name and signature