



### **Review of USB FFPW PhD thesis**

<b>First name(s), surname, titles of the PhD student:</b> Sara Roje, M.Sc.	<b>First name(s), surname, titles of supervisor:</b> Assoc. Prof. Dipl.-Ing. Miloš Buřič, Ph.D..
<b>Title of PhD thesis:</b> Cocktail of invaders in European inland waters – ecological characteristics, interactions and consequences	

#### **REVIEWER:**

<b>Surname:</b> Patoka	<b>Institution:</b> Česká zemědělská univerzita, Praha, Česká republika
<b>Name:</b> Jiří	
<b>Titles:</b> Assoc. Prof. Dipl.-Ing., Ph.D., DiS.	<b>E-mail:</b> patoka@af.czu.cz
<b>Please describe your professional relationship to the PhD student:</b> No relationship	<b>Please describe your field of expertise:</b> Decapod crustaceans, Biological invasions, Aquatic species

### **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 papers presented in this thesis are novel with possible overlap to management of biological invasions at least as an addition to our knowledge about biology, ecology and ethology of invasive species. I recommend to prepare more focused experiments to obtain more comprehensive results as suggested below. The topic is interesting for a wide international readership and presented findings have merit even if the number of outputs obtained is limited.



### ***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**):

Generally, the structure of the text is clear and sufficient. I see some minor mistakes: Certain figures and tables are given before being indicated and linked in the main text. Certain references are not properly cited (e.g. Churcholl instead Chucholl). In case of botanical nomenclature, the year of the formal description of the species is not given (thus not *Aphanomyces astaci*, Schikora 1906 but just *Aphanomyces astaci* Schikora): this rule is respected in the text but not fully. Species still formally named as described are given with the authority without brackets: e.g. *Procambarus virginalis* Lyko, 2017. This rule is not fully respected in the text. Not all species given in the table 3 are sorted alphabetically. Thousands are written in English with comma as 1,000, 10,000 etc.

The shown findings are original. Published in scientific journals with impact factor and well-presented. Results are in line with objectives of the study.

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### **OVERALL COMMENTARY ON THE PhD THESIS**

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

Obviously, the title and goal of the present thesis is much wider than the presented outputs which are not numerous. As explained in the chapter 4, the covid pandemic caused postponing of certain experiments and plans. Nevertheless, no information about first two aims was given. Even if this question is not counted as mandatory in this review, can you briefly explain if there is an effort to achieve these experiments in future?

Since the co-authored papers are not closely related to the goal of the first-authored papers, it is not possible to create the clear hypothesis which may presented papers answered. On the other hand, four published papers including two first-authored (and one paper in prep.) are enough for PhD thesis defence.

I read the presented thesis with interest and consider given findings as a nice addition to our knowledge about invasive species biology and ethology. Especially behavioural responses of invasive species to another invasive taxa are very interesting topic which would be of a higher importance year by year since the number of invasive species in Europe is rising and their encounters in the wild are more likely.

In line with your conclusion: "This thesis represents a baseline for future experimental work that focuses on more complex setups so that we may better understand invasive species and the mechanisms behind their success," I see the presented papers as "preliminary studies" which should be followed by more detailed and complex experiments including at least more invasive species at one "arena" (e.g. killer shrimp, crayfish and fish together). Also, indigenous (including endangered) species can be added to this "cocktail". Do you or your



supervisor plan to prepare an experimental design in this regard?

I have following commentaries to the presented papers:

1) Killer shrimp:

Maybe I missed the information in the paper but how with the shelters especially in ovigerous crayfish vs. killer shrimps? Were there any shelters in arenas? I guess, that this factor is very important and comparison with habitat conditions in wild is crucial to say if ovigerous females of crayfish can successfully defend their eggs/offspring or not.

Since killer shrimp co-occurs with spiny-cheek crayfish in a part of the European territory (e.g. in Elbe River near Nymburk town), an experiment focused on both species in the lab and in the wild is suggested. Do you plan any study like this one suggested?

2) Round goby and marbled crayfish:

You wrote: "Round goby can possibly cause considerable declines in invasive crayfish species of genus Cambaridae in Europe". At first, Cambaridae is a family name, not genus name. Second, I assume, that this voracious fish can prey also on indigenous crayfish fauna. Based on your conclusion, one can see the spread of the round goby as a panacea in case of invasive crayfish eradication but simply, this is misleading. Keep this in mind for future presentation of your findings.

Here are two questions to be answered within the defence:

Q1: Are there any tropical crayfish species established somewhere in Europe? If yes, can you characterize the habitat?

Q2: Explain the meaning of "The biodiversity conservation paradox" with at least one fish species example.

### **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**



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

Jihočeská univerzita  
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in České Budějovice  
Czech Republic

Prague, 7 July 2021  
Date and place

Jiří Patoka  
Name and signature