

**University of South Bohemia in České Budějovice
Faculty of Fisheries and Protection of Waters
Research Institute of Fish Culture and Hydrobiology**

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Confidential

Review of USB FFPW PhD Thesis

Surname of the PhD student: Drozd	Name of supervisor: Kouřil
Title of PhD thesis: Critical population parameters of weather fish	
REVIEWER:	
Surname: Bohler	Institution: IAPG
Name: Jörg	27721 Libeň
Titles:	E-mail: bohler@iapg.cas.cz
Please describe your professional relationship to the PhD student: none	Please describe your field of expertise: loach fishes: autecology genetics early life stages

QUESTIONNAIRE

Originality, scientific importance, prospects of the PhD thesis and benefits for basic or applied research

Evaluate its competitiveness in the international context and compare its level with the current state of the art in the field:

moderate

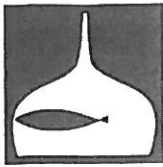
Preparation of the PhD thesis, targets of the work and deliverables

Evaluate the overall level of preparation of the PhD thesis and the originality of the selected approaches; evaluate publications and whether the targets set in the PhD thesis correspond with the declared purpose of the thesis:

moderate

OVERALL COMMENTARY ON THE PhD THESIS

Please write comments: see additional sheets



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FINAL RECOMMENDATION

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

4.9.2010

.....
Date and place

Bohler *Z. Bohler*

.....
Surname and signature

**Critical population parameters of weatherfish *Misgurnus fossilis*
(Cypriniformes, Cobitidae)**

The content of the thesis is separated into five parts: 1) A general introduction, 2+3) two manuscripts dealing with the development of early stages of *Misgurnus fossilis* under different temperatures, 4) a manuscript reporting the occurrence of different ploidy levels in specimens of a population of *M. fossilis* and 5) a general discussion.

My overall impression is that everything around the experiments, like the experimental set-up, collection of data, data analyses etc, has been carried out quite well, providing the author with an interesting set of results. In contrast, the intellectual parts of the work, like the introduction to the topic and the interpretation of the results, show several weaknesses.

Now some more detailed comments:

The title does not match the content of the study. The formulation ‘Critical population parameters’ implies that the study deals with parameters describing one or more populations of the fish or the numeric reaction of a population to environmental factors, a classical part of the scientific discipline ‘population ecology’. Instead, the main part of the study observes the functional response of individuals of the fish, a classical part of autecology. I am aware that the title may have been given as ‘working title’ before the study was started, but I know titles can be changed before producing the PhD thesis.

The general introduction in the present study contains a literature overview about various aspects of the autecology of *M. fossilis*, but nearly all of these aspects are irrelevant for the present study. In contrast, no introduction to the field of thermal requirements of *M. fossilis* or of fishes in general is given; neither to the importance of early live stages for the population development; no explanation of the physiological reaction scheme of animals to single

environmental factors (like temperature in the given case); no explanation of the physiologic reactions to sub-optimal temperatures; there is no mentioning about the different temperature sensitivity of different early life stages and no description of thermal regime in typical *Misgurnus* habitats and the real temperature values during the time of reproduction. I miss definitions and explanations of termini like 'functional response', 'critical-period-hypothesis', 'optimum curve', 'optimal, suboptimal and lethal range' and other, relevant, terms. The lack of an explanation of the basic knowledge about thermal requirements and the importance of early life stages in fishes do not prepare the reader for the aims of the study and do not convince him about their importance.

Manuscript 1:

Only a small fraction of the introduction deals with the thermal requirements of fishes, the same comments like to the general introduction apply here.

Why were the results not calculated to degree-hours? Such transfer would eliminate the error coming from the faster physiologic reaction in warmer water and bring the results into an optimum-curve that is easier to interpret.

The whole first page of the discussion is devoted to the description of the number of eggs obtained by stripping. What do these data have to do with the topic of the study?

The status of *Misgurnus fossilis* in most recent evaluations in Europe is 'least concern' or 'low risk', so why is it in the present study repeatedly described as 'endangered and protected in whole Europe'?

Manuscript 2

This manuscript obviously is based on the results of the same experiment like the first manuscript. This is no problem, but it repeats the same findings that were already presented in

the first manuscript, but it does not clear enough indicate so. These data are in fact published double and may lead to problems if the editor of the second journal finds out.

Also in this analysis, the expression of time axis as degree-hours could be helpful.

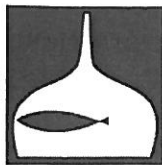
I would have liked to see a comparison of the laboratory results with field data (temperature data from data stations close to the point of collecting; published data about temperatures in *Misgurnus* habitats and other sources).

Manuscript 3 is a short report on the occurrence of several ploidy levels within one population of *Misgurnus fossilis*. The findings are very interesting and evoke new questions (e.g. origin of triploids), but the resulting questions are not topic of the present study, therefore I will not make comments on manuscript 3.

The General discussion is a summary of the former chapters and the same comments fit.

The whole text needs a major revision of English; I think that many formulations do not express what the author intended to say.

Despite many weaknesses, the manuscripts 2 and 3 provide interesting results that will stimulate further scientific studies as well as conservation measures on *Misgurnus fossilis*. I therefore recommend it (with reservations) for defence as PhD thesis.¹



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Review of USB FFPW PhD Thesis

Surname of the PhD student: Bořek Drozd	Name of supervisor: Jan Kouřil
Title of PhD thesis: Critical population parameters of weatherfish <i>Misgurnus fossilis</i> (Cypriniformes, Cobitidae)	

REVIEWER:

Surname: Ewa	Institution: Inland Fisheries Institute Zabieniec, ul. Glowna 48 05-500 Piaseczno, Poland
Name: Kamler	E-mail: kamler@infish.com.pl
Titles: Prof. Dr hab.	Please describe your field of expertise: Ecological bioenergetics in fish early life history
Please describe your professional relationship to the PhD student: None	

QUESTIONNAIRE

Originality, scientific importance, prospects of the PhD thesis and benefits for basic or applied research

Evaluate its competitiveness in the international context and compare its level with the current state of the art in the field:

This is an original, scientifically sound study, well placed in the mainstream of modern ichthyobiology.

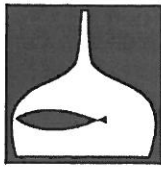
Preparation of the PhD thesis, targets of the work and deliverables

Evaluate the overall level of preparation of the PhD thesis and the originality of the selected approaches; evaluate publications and whether the targets set in the Ph.D. thesis correspond with the declared purpose of the thesis:

In the thesis I have not found any deviation from the declared purpose. Layout is correct, illustrations are professionally done, rigoristic statistical treatment is notable.

I detected minor flaws, only. Writing is not very clear. Sentences are long and complicated with excessively used parentheses () and brackets []. Table 3 on page 43 is prepared incorrectly. In Fig. 14 there are some superscripts shown for non-existing data. I have some reservations about the General Discussion chapter. Large parts of it were copied from the Discussion sections of the three articles. However, all these flaws are small matters which do not affect my overall positive opinion about the thesis.

Remaining comments – see below the ***OVERALL COMMENTARY ON THE Ph.D. THESIS***



OVERALL COMMENTARY ON THE PhD THESIS

Subjects of the thesis

Two main questions posed by the Author are: (i) response to temperature over the yolk feeding period of *M. fossilis*, and (ii) ploidy levels in a natural population. These questions receive a broad interest among ichthyologists. It is generally accepted that temperature is a key extrinsic factor influencing processes in poikilotherms. Ploidy levels are considered here in connection with genetically different lineages. I think that the subjects of the thesis are modern approaches to relevant problems.

Structure of the thesis

The thesis is composed from Chapters 1-4. In a concise General Introduction (Chapter 1, pp 7-15) Mr Drozd presents the object of his study – the weatherfish, *Misgurnus fossilis*. Defines the importance of the species. Identifies gaps in the knowledge and indicates issuing aims of the study. The General Introduction reveals erudition of the Candidate and his ability to ask scientific questions. Chapter 2 (pp 17-69) is devoted to response to temperature during early ontogeny of *M. fossilis*. It consists of two articles, one of which has already been published (thus, successfully passed the hard process of peer review), another is submitted to *J. Fish Biol.*, a top journal in the field of ichthyobiology (IF 2008 1.246). Chapter 3 (pp 71-81) focuses on ploidy levels, the article is accepted by *J. Fish Biol.* In all the three articles Mr Drozd is the first (=“senior”) author. Chapter 4 includes General Discussion (pp 83-102), followed by an English and Czech summaries. Thus, the formal structure of the work is adequate to a PhD thesis.

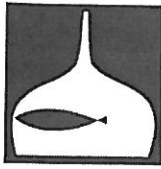
The most relevant aspects of the thesis

Here I subjectively select few aspect that contribute to the value of the thesis.

- The methodology was exemplary, which, generally, is typical of the studies performed at Vodňany. The methods for *M. fossilis* reproduction and early rearing elaborated here will have applied implications when stocking material will be produced in controlled conditions for restocking purposes.
- Notable is a dense distribution of tested temperatures over a broad range. In the world literature on fish egg incubation use of > 5 temperatures is rare. In the present study the bias was minimized due to a high number of tested temperatures.
- As usual, temperature strongly affected age at hatching, but, interestingly, almost no temperature-induced variation of hatchling size was found in *M. fossilis*. Earlier lack of effect of temperature on size of newly hatched larvae has been reported rarely. A tempting explanation would be strongly variable environment in which *M. fossilis* incubates in the field.
- The “strategy” in construction of Chapter 2, devoted to temperature effects, is worth to be mentioned. While in Part 2.1 a simple description is focused on applied aspects, in Part 2.2. the problem was re-visited and a another insight offered. This testifies for a Candidate’s tendency to deepen his insight into problems studied.
- In the Part 2.2. I am pleased to see how ably the Candidate applied to *M. fossilis*, and further developed, the method of exact quantification of temperature effects. The description of effects of temperature on digestive system activation, as well as the two-stage curve fitted by polynomial function to growth in length in post-embryonic fish, both have attributes of novelty. The investigations presented here move forward from related previous works on the same subject.
- I particularly appreciate the interesting discussion in which multiple adaptations used by *M. fossilis* to survive in its demanding environment are explained.

Conclusions

Summing up, the Ph.D. thesis by Mr Bořek Drozd is his personal achievement in the fields of fish early life history and genetics. The thesis reveals his extensive general knowledge and strong motivation to scientific research. Therefore, the thesis fulfills the conditions imposed to Ph.D. theses, and testifies that the scientific degree of Ph.D. can be awarded to him.



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Date and place

11 June 2010 Katišovice

Surname and signature

Alena Kamber