



Confidential

Review of USB FFPW PhD Thesis

First name(s), surname, titles of the PhD student: Jan Másílko, Dipl.-Ing.	First name(s), surname, titles of supervisor: Dr. Sabine Sampels
Title of PhD thesis: Production efficiency of technological modified cereals in market carp farming	
REVIEWER:	
Surname: Bauer	Institution: Bundesamt für Wasserwirtschaft Ökologische Station Waldviertel A-3943 Gebharts 33 Austria
Name: Christian	E-mail: christian.bauer@baw.at
Titles: Dr.	
Please describe your professional relationship to the PhD student: no relationship	Please describe your field of expertise: carp pond farming

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 approach of the thesis is applied research with no or minor basic research. However this is an asset of the thesis, as the topic badly needs applied research. Compared to other sectors of Aquaculture (trout, salmon), the field of feed research in carp farming is behind. Also, because there are complex interactions with pond ecosystems and the different approaches of extensive and semi-intensive production as well as the importance of natural foraging resources in the ponds. The thesis is a step to bring the topic more in the focus. Moreover the results are of high importance for the practical work of the carp farmers and will find a way into the educational system. Hopefully the work leads to further research in the field



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 structure of the thesis and the chapters is stringent. The first chapter needs some revision (see overall comments). Replications in the text are due to the combination of chapters prepared only for the thesis and chapters which are intended as a manuscript for a peer reviewed journal. Unfortunately it is not stated to which journal the manuscripts have been or will be submitted and the possible decision of the editors.

The aims and objective of the thesis are clearly stated in the introductory chapter and worked out chapter by chapter. The results correspond with aims and objectives.

OVERALL COMMENTARY ON THE PhD THESIS

Please write comments in extent of 1-2 pages:

Chapter 1 – General Introduction

Page 10: The sentence “All water bodies are either man-made....” means that this is the case in CZ, isn't it?

Figure is on page 10, on figure description on page 11.

Page 11 Tench, roach, rudd and gudgeon are referred as herbivorous fish – this is not true, omnivorous is much better.

Page 12/13: Table 12 is divided between page 12 and 13

Page 13 Carp is an omnivorous fish...water weeds, detritus, etc. - a reference would be nice

Page 13 ...food demand...stop at a water temperature of 4 °C – Not all authors would agree with this statement and there is evidence for a restricted but continuous feeding at low temperatures (if food is available of course which might be not the case in ponds in winter) – [e.g. Powles et al. 1983: Seasonal feeding of carp *Cyprinus carpio*, in the Bay of Quisite watershed. Canadian Field Naturalist 97: 293-298. Steffens 1964: Die Überwinterung des Karpfens als physiologisches Problem. Zeitschrift für Fischerei NF 12: 97-153]. However this does, of course, not affect the overall quality of the thesis.



Chapter 2 – Potential for improvement of common carp production efficiency by mechanical processing of cereal diet

The candidat presents a sound and sophisticated statistical model for the growth of commercially farmed common carp. Moreover the sub-aim of the task, to compare processed and non-processed cereals in the diet of common carp, delivers valuable data on this topic. Pressed cereals have been used for feeding in common carp by some farmer for years, but there was a lack on data and comparing studies. This has now been delivered and is worth to be included in the education programmes of carp pond farmers in the future. However the role of zooplankton in the diet of common carp is not clear from the study since there have been no differences in zooplankton composition between the ponds. As only small species dominate, the predation by carp might have prevented the development of large zooplankton organisms like *Daphnia sp.*, indicating that the stocking density might and/or management strategies might not allow a stable population to establish. However, this was not the aim of the study but might be a promising topic for further research.

Chapter 3 – Used of modified cereals and their effect on growth, feed conversion, fat content, and fillet yield of market size common carp grown in ponds

Page 47 Introduction not Itroduction

The reference *Bauer & Schlott 2009* is mentioned in the text but not in the reference list.

Carp farmers have to meet the demands of consumers regarding flesh quality especially fat content and on the other hand produce as economical as possible, which means high growth rates, good FCR and high fillet yield. In this study farmers are presented valuable data on processed versus unprocessed supplemental feed and the effects on FCR, fillet yield and fat content.

Chapter 4 – Supplementary feeding of carp with modified cereals

The demands of the European Water Framework Directive could have effects on the management of ponds connected to or interrupting rivers, which might become important for the pond farmers. Effluents from ponds can carry nutrient loads which have the potential to alter the river ecosystem and its status in the river basin management plans.

Therefore the presented work is a step to scope with this potential challenge by investigating modified cereals as supplemental feed. Especially the evaluation of the phosphorus balance is important since phosphorus is the most important factor in eutrophication of water bodies.

This is not only of importance for rivers but also for ponds as high nutrient loads in eu- or hypertrophic ponds can be a problem for fish health and welfare as well as flesh quality.

Moreover the work also includes technological as well as economical aspects.



Chapter 5 – Texture properties of common carp cultured from different systems

Product quality is of high importance for the marketing of fish and especially common carp in a highly competitive market. For carp pond farmers it is important to know what effects the management strategy has on the characteristics of the product they want to sell. So the work is an important step to provide farmers with informations how management can influence the product.

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

10.06.2014, Schrems.....
Date and place

Christian Bauer.....
Name and signature



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Review of USB FFPW PhD Thesis

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Title of PhD thesis: Production efficiency of technological modified cereals in market carp farming	
REVIEWER:	
Surname: Mareš	Institution: Mendelova zemědělská a lesnická univerzita v Brně
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Please describe your professional relationship to the PhD student: I do not have any professional relationship to PhD student.	Please describe your field of expertise: Aquaculture, fish nutrition.

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 topic of presented PhD. thesis can be found as very actual, by my opinion, mostly the part dealing with farming common carp based on the semi-intensive rearing. Many of the results in the subject matter can be considered as original, enriching the area of knowledge at the international level. The realization and achieved results were reached in close connection to operating conditions of Czech fishery. Also for that reason the results of this thesis are directly applicable in fish farming practice.

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**):

Doctoral thesis of Ing. Másílek is draft as a collection of four publications following the introduction and characterizing studied issues. One of those publications is already accepted for publishing in scientific journal, another part is processed as proven technology and last



two parts are in form of scientific manuscript. These have standard structure and the used technology also meets the requirements of this type of outputs. Particular parts of PhD. thesis logically link together and accomplish the chosen topic. The whole work is supplemented by summarizing discussion. The thesis is thematically structured to cover presented issue in order from assessment of utilization effect of processed cereals, through assessment of the effect of chosen method of cereals proceeding on the production parameters of fish rearing, including the yield of produced fish, through the assessment of their influence on the environment and the assessment of the influence of supplementary feeding on the textural characteristics of reared fish. Carried out surveillance and achieved results correspond with the set aims.

OVERALL COMMENTARY ON THE PhD THESIS

Please write comments in extent of 1-2 pages:

Presented thesis is thematically focused on the proving of possibility to make supplemented feeding of carp reared under the fishpond conditions more efficient by processed cereals.

The supplemented feeding of fish in fishponds is considered as the most effected but also as the most expensive intensifying measures as well. The utilization of cereals of various type and origin is the basic of the supplemented feeding in the fishpond farming. The attempting to improve the utilization of applied feed not only implies the improvement of their production efficiency but also decreases the impact of their application on the fishpond environment. One of the possibilities for utilization of cereals nutrients is the increasing of their availability by appropriate proceeding. It is realized usually by simple processing with minimal costs. Proving of the effect of such processing in operation is the principal topic of the first three parts of PhD. thesis. The fourth part is devoted to textural characteristics of carp muscle produced under the variously intensive farming.

Introductory part of the thesis is focused on the fish production summary and the worldwide role of common carp production, including the summary of its nutritional requirements and the feed proceeding technologies. The evaluation of the influence of carp farming on the environment as well as on the quality of the final product (i.e. fish meat) is added. The establishing of the real aims is based on this summarizing introductory part. The aims are set clearly and logically link together. There are many literature sources used in this part which proves the quality of preparation of grad student for the real work. The whole chapter is logically ordered and provides to reader a good orientation in the specialization of work.

I consider this part as well-done and my comments are only minor. E.g. at page 11, there are omnivorous fish species classified as herbivorous (Nevertheless, I don't exclude that it is the literature citation.); requirement of C vitamin should be included in the tab. and the dose of E vitamin should be specified; also I suggest to complete literature sources by the latest ones including the 2011 NRC.

I can pronounce that also the other parts of thesis are characterised by rich literature citations which are shown also in the discussion of achieved results.

The second part of the thesis is created by the contribution which is focused on the comparison of production effect of processed and non-processed cereals in the common carp farming. This



contribution is already submitted and accepted for publishing in the scientific journal. Standard parameters were used for assessment and presented results can be used in operating conditions. Only in the methodology part is not clear the way of DE level determination and number of fish in control does not correspond. As regards the third part, which is presented in form of elaborated manuscript, it is unfortunately not clear if and where was the paper submitted. Theme focus is on the comparison of the effect of mashed cereals – triticale used in the marketable fish production. I appreciate that the experiment was carried out under the operating conditions and that the assessment of feed efficiency was completed by the assessment of product quality, i.e. the yield of fish and a fat content in the fish muscle. Also using of non-invasive method of fish fat content establishing by Fat meter is very positive. I have only minor comments to completing the units into tab. 1 and reducing down the number of decimal places to 4 in tab. 2. There is already presented the way of calculating DE in applied cereals in this thesis.

The fourth part is formed as the proven technology, which means in direct connection with operating practice with the possibility of immediate utilization. Processed results are based on the operating data and the monitoring during the years 2009 – 2012 in our biggest fishery organisation. The assessment of the effect of using the processed cereals is extended by the assessment of total phosphorus balance in the monitored fishponds due the used processing of current cereals. Based on the presented results, it is clear that the effect of phosphorus extraction from the fishpond environment by the fished out fish increases when using the processed cereals.

The fifth part of thesis is devoted to the assessment of the influence of the common carp farming intensity on its textural qualities. The results are again presented in the manuscript form without any other specification. Samples of fish reared under the conditions of extensive or semi-intensive farming were assessed. Four years old common carps in the marketable size were used. Methodology of processing and evaluation of samples is precisely described in this part. The results are standardly statistically evaluated and put through the wide-ranging discussion. Graphical representation is used for the clear illustration. However, my comments concern the selection of fish used for analysis. These fish are presented as four years old with the weight of approximately 1,5 kg from semi-intensive farming and 0,9 kg from extensive farming. This weight is very low by my opinion, it can not be considered (0,9 kg) as marketable. Weight differences, which are probably caused by nutrition conditions, can influence the evaluated parameters. Groups similar in weight should be basis for such evaluation which I, with the agreement of authors, consider as very important for product quality characteristics. There are missing other characteristics in fish characterisation such as the origin of fish, semi-intensive farming description etc. Commented inadequacies are devaluating achieved results to a certain extent than. Next comments are relates to the link to fat analysing method. There is missing a principle explanation, hardness data are mixed up between groups in the abstract. However, I really appreciate the numbers of used literature sources and the extent of discussion.

Final part is focused on the summarizing discussion of presented issue and achieved results. The whole part is clearly arranged with applying of considerable number of literature sources. Relatively brief conclusion summarizes achieved results also from the set aims point of view.

I have two questions for scientific discussion:



- 1- What supplementary feeding growth ratio do you consider as optimal for marketable carp farming?
2 – What do you think of the utilization of Finishing Feeding Strategy in common carp farming?

Generally, I can pronounce that presented PhD. thesis meets the requirements of this type of qualification thesis. Author has proved the capability of theoretical preparation, practical realisation of experiments and evaluation and presentation of achieved data including the comparison with literature sources as well. Based on the carried out monitoring he generalized achieved results which are original in many cases and useable in operating conditions of product fishery. Stated evaluation is supported by attached list of publication activities of doctoral student. I recommend the submitted thesis for defence and after successful passing than confer the appropriate scientific title according to legislation in force.

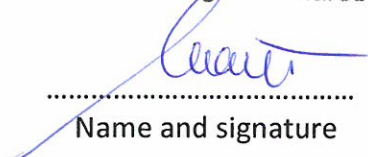
FINAL RECOMMENDATION

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

16.6.2014 Brno

Date and place

prof.Dr.Ing. Jan Mareš



Name and signature