



Confidential

Supervisor's Review of USB RIFCH PhD Thesis

Surname of the PhD student: Hubálek	Name of supervisor: Prof. Dipl.-Ing. Martin Flajšhans, Dr.rer.agr.
Title of PhD thesis: Polyploidization capacity of sturgeons and its influence on fitness	

OVERALL COMMENTARY ON THE PhD THESIS

Martin Hubálek has firstly entered my lab to solve his BSc. thesis topic which was successfully defended in 2016. Two years later he also successfully defended his MSc. thesis in my lab. Having been very satisfied with his dutiful approach and diligence along with his professional skills acquired as an eminent graduate of MSc. curricula at our faculty, I invited him gladly to join our team solving the research project on sturgeon polyploidy and biology of such fish, to study polyploidization capacities of sturgeons and the effects of polyploid genome status on their fitness, especially whether polyploidy gives them any advantage or disadvantage to survive and perform under suboptimal conditions.

Being already professionally educated in fisheries, Martin Hubálek became familiar with methods of polyploidy induction, with design, management and operating various incubation and performance tests, as well as with operating the swimming tunnels, evaluation of results and their statistical assessment. As a part of these activities, he also became more familiar with fish haematology and blood biochemistry.

His PhD thesis is conducted as a compilation of three papers published in peer-reviewed IF – journals (Chapters 2 - 4), with the introductory review on incidence, consequences, advantages and disadvantages of polyploidy in fish and particularly in sturgeons (Chapter 1), further completed with manuscript on the effect of polyploidy on swimming performance of the species and hybrids studied (Chapter 5). The last Chapter 6 deals with general discussion and relevant conclusions.

I can see the most important milestones of progress achieved in work and thesis of Martin Hubálek as follows: A) He participated actively on novel pilot testing the application of hydrostatic pressure shock as a highly efficient tool for retention of the second polar body (i.e. induction of triploidy) in sterlet, that resulted in better yields of triploidized progeny than conventionally used temperature shocks. B) He developed field-feasible protocols for extended storage of sturgeon blood, fin and larval tissues



for subsequent determination of ploidy level by flow cytometry. This is extremely useful in cases of distant field sampling without immediate access to the lab, or for need of simultaneous screening large numbers of samples. It was already highly appreciated in a foreign review on flow cytometry in aquaculture in Cytometry Part A journal.

C) He found that the early developmental stages of triploid sterlet did not differ from their normoploid counterparts in the ability to survive, grow and develop under both optimal and suboptimal temperatures, while the viability of induced tetraploid embryos was considerably lowered at optimal- and even more so at suboptimal temperature conditions, and biologically hexaploid sterlet arisen from triploidization followed by tetraploidization were unable to survive prelarval period.

D) He found that triploidy did not impair the swimming performance of juvenile sterlet, Siberian sturgeon and their reciprocal hybrids and these fish were capable to fully compensate for having fewer erythrocytes than normoploids in their Hb and PCV levels, and their primary and secondary stress response to exhaustive exercise was not altered by the presence of polyploidy.

As a supervisor of Dipl.-Ing. Martin Hubálek, I can state that the aims of this PhD thesis were fulfilled and that the author came out with several novel findings which enriched the still fragmented knowledge on sturgeon polyploidy and its consequences.

Finally, I recommend his PhD thesis for defense.

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

Vodňany, May 17, 2022
Date and place

prof. Flajšhans.....
surname and signature