



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

Confidential

Supervisor's Review of USB RIFCH PhD Thesis

Surname of the PhD student: Rahi	Name of supervisor: M.Sc. Viktoriya Dzyuba, Ph.D.
Title of PhD thesis: <i>Fish sperm respiration: species specificity and effect of environmental temperature</i>	

OVERALL COMMENTARY ON THE PhD THESIS

The Ph.D. study of Deepali Rahi is done in the very important but still underexplored area of fish spermatology – bioenergetics. The main attention of Deepali was devoted to the investigation of the relative input of different metabolic pathways responsible for the energy supply of spermatozoa in fish species characterized by different sperm motility duration and spawning temperatures (sturgeons and burbot).

The introduction part of the thesis describes the current knowledge in the selected field of study and raises questions about differences in the energy budgeting strategy of spermatozoa of selected fish species, as well as spermatozoa at different states (quiescent, motile, and resting before attaining the second period of motility). The relative contribution of different bioenergetic pathways in the energy supply of motile and immotile spermatozoa of Siberian sturgeon (Chapter 2), the effect of low environmental temperature on the input of different bioenergetic pathways in the energy supply of spermatozoa, and the possibility of adaptation of sperm mitochondrial activity to the maximum critical temperature in under-ice spawning burbot (Chapter 3) were studied. Inhibitory analyses performed by Deepali revealed the central role of oxidative phosphorylation in the energy supply of spermatozoa at motile and immotile states. Nevertheless, mitochondrial respiration was shown to be not efficient enough to meet high energy demands during the motility period. Despite some found species-specific features in mitochondrial respiration, the results obtained testify that the primary source of energy required for sperm motility is ATP stock generated and accumulated during the quiescent state. The last part of the study, the most exciting and promising from my point of view, was focused on investigating the possibility of sturgeon sperm reactivation with particular attention to sperm bioenergetics (Chapter 4). The study in this direction has yielded results that, although they still need further exploration and analysis, are of great potential from the point of view of fundamental knowledge and applied aspects.

Additionally, I would like to mention that Deepali learned rather complex techniques to study fish sperm bioenergetics and always wanted to learn something new that can help in solving the problem. She can organize teamwork; she is excellent in the presentation of results and is just a nice and friendly person.

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

15.10.2021 Vodňany
Date and place

Azyuba A35
surname and signature