



Confidential

Supervisor's Review of USB RIFCH PhD Thesis

Surname of the PhD student: Prokopchuk	Name of supervisor: Jacky Cosson, Ph.D., Dr.h.c.
Title of PhD thesis: Flagellar movement initiation, signaling and regulation of fish spermatozoa: physical and biochemical control	

OVERALL COMMENTARY ON THE PhD THESIS

Galina's thesis manuscript, fortunately completed right at the deadline of her fourth year of researches, presents a set of results definitely original in the field of aquaculture, but reveals only part of the observations she obtained during this period. Many results remain presently at the "writing in progress" stage or even still unexploited in her drawers. The main reason is that the approach of sperm flagella movement undertaken by Galina by using new technologies offered by high-speed video cameras allows application to a huge diversity of species (not only fish but many others) or envioning situations where spermatozoon behavior can be recorded, but those technologies, at the same time, generate metadata that Galina was not prepared to handle by use of mathematical tools. In other terms she has been facing one limit commonly encountered by many biologists when they approach the border with mathematical analysis.

The high quality records Galina obtained by use of a high-speed video camera give rise to huge numbers of images that only computer-assisted analysis can deal with. During her PhD's studies, Galina developed skills leading her to well control conditions of observations of fish spermatozoa that present a double challenge: their very short swimming period, ranging seconds and their very small size ranging micrometer. Even though her mathematical skills were limited, Galina succeeded to extract from her video records a lot of information using a much more tedious and time-consuming way, mostly by drawing flagella images and measuring their geometrical parameters with a ruler or so. Through my above description, I mostly would like as supervisor of Galina during her PhD, to emphasize two main traits of Galina's personality: one is her stubbornness finally leading to successful results as opposed to a second one that is her difficulty to adapt to a deadline, mostly because she never counts the time investment necessary for a task. It is my hope that when her PhD will be fully finished and defended, Galina will finally devote time to complete the so-many unpublished manuscripts that she undertook. My second hope is that the skills she developed during her PhD will be very useful in the new field of her Post-Doc investigations.



All the above comments should not minimize the content value of the PhD thesis itself: the most prominent and original publication is represented by the visualization, for the first time, of the very initial phase of movement that a fresh-water fish spermatozoon exhibits when contacting external milieu. This pioneering quantitative description reveals in details how the mechano-chemical device called flagellum can become fully active almost instantly, provided a simple signal (contact with surrounding water) is delivered, giving rise to full wave propagation along the flagellum consequently propelling the spermatozoon at maximal speed.
Altogether and at the present time, I consider that the formal state reached by the PhD thesis document of Galina is ready for submission.

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

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Date and place

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Gosson

surname and signature