

Jury Member Report – Doctor of Philosophy thesis.


Name of Candidate: Valentina Burskaia

PhD Program: Life Sciences

Title of Thesis: Positive selection in parallel evolution

Supervisor: Associate Professor Georgii Bazykin

Name of the Reviewer:

<p>I confirm the absence of any conflict of interest</p> <p>(Alternatively, Reviewer can formulate a possible conflict)</p>	<p>Signature:</p>  <p>Date: 16-11-2020</p>
---	---

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

In the presented PhD thesis “Positive selection in parallel evolution” Valentina Burskaia analyzed identical nonsynonymous substitutions in different species and adaptation as a possible reason of the identified substitutions.

The thesis consists of two parts.

First, Valentina analyzed repeated non-synonymous substitutions in different groups of species. For the analysis, she chose the following three groups: (i) lake Baikal amphipods, (ii) lake Malawi cichlids, and (iii) vertebrates. Valentina found that amphipods demonstrate high rate of parallel non-synonymous substitutions, significantly higher than expected. The effect demonstrated by the cichlids was not so prominent while the rate showed by the vertebrate group was lower than expected. Valentina reasonably accounted the found results to adaptations in the amphipods and negative selection in the vertebrates.

In the second part, Valentina tests a reasonable hypothesis that birds experiencing lower level of oxygen should demonstrate adaptations in the genes responsible for breathing. The lower oxygen level could arise due to different reasons like flying at high altitudes or diving.

The results of the presented work are scientifically significant and comply with the international level and current state of the art. The work is perspective for future applications and fundamental research. The publication is of high quality, the number of publications suits the requirements for the PhD thesis.

The dissertation conforms to high international standards. It has a clear structure; the topic corresponds to the actual content.

The remarks that I have concern only the text of the thesis. For example, the first reference to Fig. 3 is located in the page 27 of the thesis while Fig. 3 itself is situated in the page 36, i.e., nine pages later, which is not convenient for readers. In the page 28, Valentina writes “...we used our approach developed previously (Bazykin et al. 2007).” However, Valentina is not a co-author of the 2007 paper, and, therefore, the use of the word “our” is not relevant here (contrary to the paper Burskaia et al., 2020, where the use of the word “our” is completely acceptable since Bazykin is one of the co-authors). There are also a few number of misspellings; the corresponding list is sent to the dissertant.

To summarize, I rate the PhD thesis of Valentina Burskaia as very important, of high quality and scientifically significant.

Provisional Recommendation

I recommend that the candidate should defend the thesis by means of a formal thesis defense

I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate’s thesis according to the recommendations of the present report

The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense