Skoltech
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Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Rim Gubaev

PhD Program: Life Sciences

Title of Thesis: Genetic association mapping for agronomically important traits in rapeseed and sunflower

Supervisor: Professor Philipp Khaitovich

Name of the Reviewer:

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Date: 09-09-2022**

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

· Brief evaluation of the thesis quality and overall structure of the dissertation.

The PhD thesis consists of 143 pages and has classical structure including Introduction, Literature review, Material and Methods and Results divided into three chapters. The last chapters of the PhD thesis are "Conclusions and future perspectives" and Bibliography. A special note must be made about the author's excellent literature overview on genomic selection and marker assisted breeding (MAS). There is also a clear explanation of modern plant breeding trends and problems for sunflower and rapeseed. This gives a good impression of the state of the art of the PhD study.

· The relevance of the topic of dissertation work to its actual content
The topic of the thesis is absolutely relevant to the presented PhD study.

· The relevance of the methods used in the dissertation
The author used a set of modern methods for plant genotyping, phenotyping, bioinformatics and statistical analysis of the results.

· The scientific significance of the results obtained and their compliance with the international level and current state of the art.

It is possible to apply the results of the PhD study to accelerated breeding strategies for rapeseed and sunflower cultivars in Russia using MAS and GS approaches. Therefore, the results of this work are important for further practical implementation. A number of genetic markers and the candidate genes found by the authors have been already described before. In the present PhD study, however, new loci associated with important traits have been identified, paving the way for further investigation.

· The relevance of the obtained results to applications (if applicable)
The results of the PhD study directly have direct link to the application. The discovered genetic markers associated with important agronomic traits will be valuable for MAS selection and genomic selection of rapeseed and sunflower. Importantly, the authors demonstrated that some traits (e.g. Tph2-associated phenotypes) can be quite accurately predicted by found genetic markers.

· The quality of publications
Rim Gubaev has several publications related to the PhD study, with two publications where he is the first author. The papers are published in relatively good peer-reviewed journals. Considering the PhD level, the number of publications is very good.

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

Chapter 4.2: the number of accessions used for genotyping should be mentioned in the beginning of this part.

The explanation of differences between yellow- and dark seeded winter lines revealed by PCA is unclear to me. What does “the recent breeding history“ mean ?

Chapter 5.2: why these lines (VK101, VK303 etc.) were involved in crosses ? It may be better explained in the text. Also, the names of the lines differ between text and Table 5.2.1 (‘B’ should be replaced by ‘V’ letter).

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*