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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: Dr. Dragana Miladinović

I confirm the absence of any conflict of interest.	**06-09-2022**

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
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

The relevance and significance of the topic and results

In the thesis, candidate did extensive genetic study of diverse Russian sunflower and rapeseed collections and tried to identify genetic markers and genes associated with agronomically important traits. Since application of molecular tools in sunflower and rapeseed breeding in Russia is lagging compared to other countries, the study is very timely and relevant. The results of this thesis would also be of significance for rapeseed and sunflower breeders in other countries, as well, with the new data on genes and markers for relevant traits, but also on genetic diversity, which is of special importance in sunflower. All methods used in the thesis are well chosen, and results analyzed in proper way. Some of the results, such as those related to tocopherol and oleic acid content in sunflower oil, could be directly applied in breeding, while other need further verification and studies. The publications coming up from the thesis are of good quality and published in journals with IF >3.

Issues to be addressed

Chapter 1 Introduction

The mutations mentioned ass innovations are not spontaneous but induced. Term used for NBT is not genetic editing, it should be replaced with genome editing.

3.1.1 Rapeseed diversity panel

Please confirm if genotypes used are all inbred lines, or there are some varieties. The table with all genotypes used, some traits and origin would be of use.

3.1.2 Experimental crosses for oil-related traits mapping in sunflower

The reference should be added related to info provided on traits of parental lines (VK101, VK303, VK876 and VK1959.

3.1.3 Sunflower diversity panel

The table with all genotypes used, some traits and origin should be provided.

3.2.1 Glucosinolate measurement

Add "in rapeseed" in the title. Please provide more information on the plant material used: how many plants/line, etc.

3.2.2 Tocopherol composition and oleic acid content measurement

Add "in sunflower" in the title. Please be more precise regarding plant material used: seed quantity, genotypes, plants/genotypes, was material collected only one year, or three? Provide the same info both for tocopherol and fatty acids.

3.2.3 Seed-related traits assessment

Add "in sunflower" in the title. Same as above, provide more detail on plant material analyzed.

3.4.1 Association mapping of glucosinolate content

Add "in rapeseed" in the title.

4.4 Association mapping and scanning for novel candidate genes

No significant associations for SNPs from the previous studies were identified in the experiment. It has be done to a certain extent, but please elaborate on this further. Name other possible reasons, what does it mean from the aspect of the validity and applicability of your results.

4.5 Conclusions

Please name identified genes, regions and markers when mentioning them in the text.

5.7 Conclusions

In the thesis, no additional loci controlling tocopherol composition were identified, whish is in contrast with some other studies. So, please elaborate further, explain possible causes, are these findings unique for this study, or some other authors also did not observe any additional loci. The same stands for discordances with the hypothesis initial set for oleic acid content.

When you mention a set of genetic markers for tocopherol content identified, please name them.

6.5 Conclusions

In the thesis, only preliminary results of the association mapping of seed-related traits are provided. Hence, this should be pointed out both in the results, conclusions, final conclusions, etc. It is also claimed that these preliminary results provide some insights on seed-related traits. What are those insights? Are there relevant since this is only preliminary study without strong phenotyping data? Furthermore, It should be noted that the identified genetic markers explained not more than 7% of phenotypic variance. Could they be considered genetic markers and of any breeding value at all? If yes, please explain why.

Chapter 7. Conclusions and future perspectives

Point 3) Add "Preliminary" before association. It is stated that 25 SNP markers associated with the seed-related traits are identified and, along with new candidate genes. Could you claim this, as it differs from what is said above in section 6.5. Should be rephrased as to reflect that the results obtained are preliminary.

Provisional Recommendation
☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense*
X *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*