

## Reviewer assessment

Author of the thesis: Aşkın Nur Özkan

Title: The effect of the maternal epigenetics on hybridization barriers.

Type of thesis: Master of Science

The thesis of Bc. Aşkın Nur Özkan focuses on assessing the role of maternal epigenetics in pre- and post-zygotic hybridisation barriers between *Arabidopsis thaliana* and *Arabidopsis arenosa*. To investigate the role of maternal epigenetics, the author performed a hybridisation experiment involving *A. thaliana* epiRILs and *A. arenosa* as a pollen donor and obtained results in the form of seed set and hybrid seed viability ratio. The author applied a range of appropriate statistical tools to link the epigenomic data with phenotypic data.

The thesis has a traditional format – it starts with an abstract followed by the introduction, objectives, materials and methods, results, discussion and conclusion. The text possesses minor mistakes and lost punctuation marks; however, considering the complexity of the topic, the work is well-structured and clearly written. The introduction consists of nine pages of easy-to-read information explaining mainly the phenomenon of reproductive isolation in plants and the role of epigenetics in it. I find the introduction sufficient for understanding the research topic, with well-described mechanisms of epigenetics' role in endosperm development and interspecific seed lethality. However, I find the definition of "epigenetic" chosen by the author – "stably heritable phenotype resulting from changes in a chromosome without alteration in the DNA sequence" – to be insufficient, as it overlooks covalent modifications of DNA bases. Overall, the introduction section shows that the author is familiar with modern literature in the field and understands the scientific problem.

The material and methods section is clear and well-structured. The presence of the figures explaining the scheme of the experiment also facilitates comprehending the thesis. However, given the extensive use of abbreviations throughout the text, a list of abbreviations at the beginning would have been helpful for easier reference during reading.

The results section consists of nine pages of short text, figures and abundant tables showing the main findings of the work. Some of the figures and, particularly, tables (e.g., Tables 4 and 5), would benefit from improved quality and clearer formatting in this section. The results contain some uncertainty regarding the pollen donors and the impact of the variables.

The discussion section consists of four pages, integrates the data in a broader picture, summarises the findings in the work and answers some questions. This section also highlights some of the work's methodological and experiment planning weaknesses, mostly because of the biological diversity of epiRILs, which might affect fertility. I greatly appreciate the author's honesty in interpreting possible results, including factors such as technical problems in growth chambers. No one is immune to force majeure, but openly discussing the limitations of such results demonstrates high scientific integrity.

The work seems to meet its main objective "to evaluate whether epigenetics, particularly the maternal epigenome, could be involved in two hybridization barriers: prezygotic postmating barrier, and hybrid seed lethality", demonstrating that maternal epigenome influences both pollen rejection and hybrid seed failure between two investigated species. Although the exact molecular mechanisms underlying this influence remain unknown, exploring these mechanisms was beyond the scope of the author's research.

In summary, I find this work to be a well-executed diploma thesis that contributes valuable data to our understanding of the epigenetic influence on pre- and post-zygotic hybridization barriers in plants. Consequently, I recommend this thesis for defence and suggest awarding the highest final grade.

Olomouc 15.08.2024

M.Sc. Serhii Mykhailyk, Ph.D.

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