



## Evaluation of PhD thesis

**Thesis title: Consequences of the mating system shift on the evolution of sexual traits in flowering plants**

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Consultant: Said Hafidh, Ph.D.

Reviewer: prof. RNDr. David Honys, Ph.D.

The presented dissertation thesis is written in English and is structured in the “short” way into Abstract, General chapters, Aims of the thesis, short Methodology, Discussion of the Results, Conclusion, and the list of References. These chapters are followed by the part VII – Case Studies – that actually represent publications. The thesis is based on five papers; at the time of submission, two papers were published (*Plant and Cell Physiology, Evolution*), and three were presented as manuscripts. Mr. Iltas is the first author of four papers including both already published, and in the last manuscript he served as the second author. The cumulative impact factor of two published papers is 8.037.

The thesis is 138 pages long (including attached articles) that makes it reasonable but not extensively long. The thesis is well-readable and, apart from minimal inaccuracies, written in good English.

The declared objective of the work was to investigate 1) the consequences of mating system shift on the evolution of sexual traits, underlying genes, proteins, and 2) subsequent impact of this shift on establishing post-zygotic reproductive barriers in flowering plants. Each of the main objectives was further dissected to several specific or secondary objectives, making them seven in total. I appreciate that the author looked at various aspects of the problem, evaluating the mating system shift and its consequences from several angles. This included evolution of sexual traits and underlying molecular mechanisms, pollen performance, female preferences, pollen morphology, pollen coat protein composition, parent-specific gene imprinting, and emergence of reproductive barriers and speciation. All objectives were met satisfactorily.

The first chapter, here called General chapters, is basically an Introduction. It gives the reader a comprehensive overview about the topic from several points of view related to

the thesis topic and its objectives. This sole chapter has a potential to serve as a reasonable information resource about the studied plant species and the processes underlying the mating system shift. It provides sufficient number of details in combination with general overview. I like the brief historical exercise that is, when talking about sexual selection or speciation, quite interesting and helpful.

In the Methodology chapter, the author briefly describes the model systems used in his work and the methods used, which, again given the focus of the work, is useful. This chapter highlights -omics approaches and thorough data analysis as the main tool and, presumably, the main strength of the author.

The actual results are provided in a form of five Case studies, in fact individual papers and manuscripts. They are usually self-explanatory; I am only not sure whether the last or most actual versions of the manuscripts were included in the thesis. I am mentioning this as according to our discussions, the consultant of this thesis was supposed to co-author the manuscript presented as Case study 3 but I don't see his name among the authors.

Interestingly, the Discussion of the Results chapter precedes the Case studies that is a bit unusual arrangement but it keeps all parts of the thesis except papers together. This chapter has a logical structure and discusses the obtained results in sufficient detail. In fact, the discussion is carefully written that represents further added value of the work. The most important data from discussion are further highlighted in Conclusions confirming that the thesis aims were met.

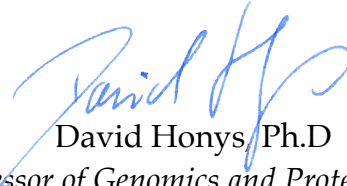
Questions:

- 1) At the beginning of the Part I, the author mentions the "abominable mystery" of the exceptional dominance of angiosperms reached in very short time. The author offers an explanation of this phenomenon. Are there also some other complementary or alternative possible explanations available?
- 2) If the pollen coat proteome convergence was not driven by selfing syndrome, could a possible reverse evolution (in other species examples) from selfer to outcrosser also be independently driven by the evolution of pollen coat proteome? Could pollen coat metabolites perhaps be the evolutionary trait accompanying/instead of the pollen coat proteome?
- 3) If the evolution of the pollen coat proteome is not accountable for the outcrosser to selfer transition, what other traits can be the driver for selfing syndrome? What contribution would pollinators (presence/absence/or their evolution upon biotic influence and/or climatic changes) play to drive mating transitions in flowering plants?
- 4) It is considered that mating system (at least in plants) can evolve rapidly in response to ongoing environmental changes. Could you speculate, what would be the approximate/average time period for instance in Brassica?

## **Final evaluation**

Overall, this is a high-quality thesis with interesting results supported by relevant publications. The above comments do not substantially diminish its value. Mr. Iltas has demonstrated his creative abilities in the given field of research and his thesis meets the standard requirements for a dissertation defence in our field.

**I recommend the dissertation thesis for defense**



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Prague, January 10, 2025