

Reviewer's Dissertation Thesis Report



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Dissertation Thesis Title: **W chromosomes in Lepidoptera: evolution, diversity and molecular features**

Student: **RNDr. Martina Hejníčková**

The Thesis by Martina Hejníčková is subdivided into two major sections. The first part represents Introduction and the second part is composed of her own research. The Thesis consists of three papers with Martina as a first author in all cases (Genes, Cells and Scientific Reports). To be honest, it is almost inappropriate to evaluate collection of such achievements. Number of evaluators has already corrected and discussed presented results. Anyway, it raises my first question. **What was the most discussed or problematic point (if any) during reviewing process (no need to discuss all papers)? Did you consider writing a review on topic of thesis?** You could use modified sentence from your thesis for it: “W chromosomes - a wasteland of opportunities“.

Everything seems to be smooth in the logic of dissertation. **Anyway, if you start again would you change something in experimental design?**

As far as I understand, your major scientific business is cytogenetics. In plants, **existence of oligo painting probes significantly enhanced our abilities to run projects dependent on comparative cytogenetic methods. Do you feel something similar happened in case of insect research?**

Author studied effect of retrotransposons and other repeats on evolving W chromosome. **Do you think that concept of Y chromosome toxicity found in Drosophila (Nguyen et al., 2021) is apparent in ZW systems (connections between repetitive DNA, TE activity, heterochromatin loss, and sex-specific aging)? Can you pick some differences between XY and ZW evolution?**

As one of your results, accumulation of repeats on non-recombining W chromosome has been described. **What about the Z? From plant kingdom we know that even X is prone to repeat accumulation due to the specific regulation of retrotransposons in male germline.**

Do you see such phenomenon in butterflies (as a consequence you could e.g. see large Z in some cases)?

As far as I know, butterflies evolved holocentric chromosomes (all?). Some people say that holocentric architecture could offer plants a generally higher tolerance to various sources of DNA damage like radiation during the process of land colonization. **What could explain existence of holocentric chromosomes in butterflies? Is there any correlation between holocentrism and ZW system existence?**

PhD thesis clearly fulfils all criteria needed and I fully and without any hesitation recommend it strongly for the successful defense procedure.

Date, 14.2.2023

Roman Hobza, Ph.D.