



Review of the habilitation thesis by Yulyia Krasilenko, entitled "Novel insights into the biology of stem and root parasitic plants", Palacký University Olomouc, Faculty of Science, Department of Biotechnology

The reviewed habilitation thesis is a comprehensive overview of various aspects of the biology and ecology of stem hemiparasitic and holoparasitic plants, as well as root holoparasitic plants. The topic is excellent and timely, as parasitic plants represent a very interesting group about which much still remains to be learned. In addition, some parasitic plants significantly affect agricultural crops, and their study may lead to substantial advances in their control.

The thesis is structured into three general introductory chapters presented on 40 pages, followed by almost 350 pages of appendices containing 21 papers, most of which have already been published in renowned journals.

The first chapter deals with parasitic plants in general, comparing them with other angiosperms and discussing their complex role in ecosystems. It also presents the interesting phenomena of hyperparasitism and autoparasitism.

The second chapter focuses comprehensively with stem parasites such as mistletoes and dodder. It presents many new findings, including an important study of the dodder cytoskeleton at the pre-attachment stage of its life cycle. Significant attention is also paid to applied aspects, including monitoring damage caused by mistletoe and proposing effective control measures and strategies to suppress the adverse effects of parasitic plants.

The third chapter addresses various aspects of holoparasitic Orobanchaceae. It is again methodologically very comprehensive and includes, for example, the optimization of *ex situ* cultivation techniques, which are extremely challenging for parasitic species, the study of a new model species, *Aeginetia indica*, for investigating the role of the cytoskeleton in interactions with host species, as well as a comprehensive study of the biology and ecology of the intriguing species *Lathraea squamaria* and an examination of taxonomic value of seed micromorphology and fatty acids profile in Orobanchaceae.

Overall, the work covers a wide range of perspectives in morphology, anatomy, physiology, systematics and nomenclature, ontogenesis, reproductive biology, distribution, and conservation biology. Ecological aspects, interactions, and impacts on other organisms in ecosystems where the studied parasitic plants occur are also emphasized. I consider it particularly important that the work has practical applications and proposes solutions to current problems caused by parasitic plants in agricultural production, including direct technical solutions. The thesis therefore brings many new findings from diverse areas of the complex biology and ecology of parasitic plants. However, what I regard as the most beneficial and highly innovative aspect is the integration of all these perspectives into a comprehensive approach to the subject.



I consider all the presented papers to be of high quality and scientific value. Most of them have already undergone peer review, so there is no need to comment on them in detail. I have only a few minor and insignificant comments that are not worth mentioning here. However, I would like to ask the candidate several more general questions.

- 1) Do you have any hypothesis as to why there is such a difference in the range of host species among the three common subspecies of *Viscum album* (subsp. *album*, subsp. *abietis*, subsp. *austriacum*). Why do subspecies associated with conifers not parasitize non-native conifer species, and what could be the cause of their taxonomic diversification?
- 2) In my experience, mistletoe parasitizes a greater number of host species the centers of *Viscum album* subsp. *album* patches than at their edges, where mistletoe often grows often on a single host species. Is there a physiological explanation for this, or is it simply a matter of seeds quantity?
- 3) To what extent can the flowering time of *Lathraea squamaria* be influenced by the host species? There are reports in the literature of late-flowering populations of *Lathraea* parasitizing *Picea excelsa*. What is your opinion on their possible taxonomic significance? Have you studied differences in phenology between populations of *Lathraea* parasitizing on different host species? Could differences in host plants structure play at least a partial role in the origin of so-called seasonal types in some hemiparasitic genera of the family Orobanchaceae?

In conclusion, it is my pleasure to state that the submitted work clearly demonstrates that the candidate meets all the requirements for obtaining the title of associate professor. She has original ideas and a clear visions, is able to connect diverse topics, and inspires colleagues from various fields to engage in joint research and publications. She maintains extensive international cooperations and studies her main research topic across different regions of the world. Her publication output is high and her papers have received numerous citations. She supervises student theses and publishes their results together with them.

I am pleased to recommend her habilitation thesis for advancement to the next stage of the habilitation procedure.

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