



Posudek oponenta habilitační práce

Masarykova univerzita	
Fakulta	Přírodovědecká
Obor řízení	Fyziologie rostlin
Uchazeč	RNDr. Martina Špundová, PhD.
Pracoviště uchazeče, instituce	Univerzita Palackého, Přírodovědecká fakulta, Olomouc
Habilitační práce	„Leaf senescence as a light-dependent process“
Oponent	doc. RNDr. Jan Hejátko, Ph.D.
Pracoviště oponenta, instituce	Středoevropský technologický institut a Přírodovědecká fakulta, MU Brno

Posudek

Review of the Habilitation Thesis by Martina Špundová

The proposed work describes the mechanisms involved in the control of senescence, a process of high developmental and physiological importance in plants.

In the first sections, the basic mechanisms of plant senescence as well as factors controlling its onset are introduced. It is well written, familiarizing the reader with all the important facts, allowing to create the overall image at sufficient detail.

Here I have only minor comment regarding the use of abbreviations with relatively high frequency, which makes the reading sometime rather difficult. Some of the references are not properly cited (e.g. Lara et al., 2004 should be cited as (Balibrea Lara et al., 2004)).

In the Results section, comprising data published in six papers, the candidate is demonstrating the results she has (together with her colleagues) achieved on the senescence-associated changes in the chloroplast structure (Spundova et al., 2003), xanthophyll cycle activity (Spundova et al., 2005a), the effects of plant shading on lipid peroxidation and photosynthesis (Spundova et al., 2005b), the protective and/or damaging role of cytokinins in the senescing wheat leaves (Vlckova et al., 2006), light/cytokinin crosstalk in *Arabidopsis* (Janeckova et al., 2018) and the effects of exogenous cytokinins on the stability of photosystem II in dark-senescing leaves (Janeckova et al., 2019).

The data are published in rather mid- or low-impact journals. However, I do appreciate that with the single exception, the candidate is first or last author and thus dominantly contributing to the presented digest of her publication record.

The data were evaluated and successfully past the peer-review process, therefore I do not feel authorized to evaluate its quality (which anyway I do not doubt about ;-)).

Dotazy oponenta k obhajobě habilitační práce

Based on my professional experience and field of interest, I have following questions:

1. The candidate together with other co-authors suggests a model for the interaction of cytokinins and light in the control of leaf senescence. Based on the different levels of endogenous cytokinins observed in various combinations of double mutants associated with various effects on the activity of photosynthesis and lipid peroxidation in detached *Arabidopsis* leaves, the authors suggest various specificity of individual cytokinin sensors in the control of both processes (i.e. photosynthesis and lipid peroxidation). Could the candidate comment on the possible mechanism of the proposed sensor specificity?
2. In the model shown in the Fig. 9, the candidate proposes different effects of high light on the control of photosynthesis and lipid peroxidation in *ahk2 ahk3* and *ahk3 ahk4* when compared with *ahk2 ahk4* mutant. Could the candidate comment on the experimental evidence leading to this conclusion?
3. The candidate is mentioning possible role of AHK3 in mediating the (negative) role of cZ in the control of senescence. Is there any other evidence but the one (positive correlation between chlorophyll content/photosynthetic efficiency and *ahk2 ahk4*) observed in detached *Arabidopsis* leaves (Janeckova et al., 2018))?

Závěr

Overall, I do find the submitted work of high quality. Considering the previous publication record and its citation response, the candidate is apparently well accepted by the community and thus worth of the academic recognition.

Best regards,

V Brně, 19.9.2019

References

- Balibrea Lara, M.E., Gonzalez Garcia, M.C., Fatima, T., Ehness, R., Tanner, W., and Roitsch, T. (2004). Extracellular invertase is an essential component of cytokinin-mediated delay of senescence. *Plant Cell* **16**, 1276-1287.

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- Janeckova, H., Husickova, A., Ferretti, U., Prcina, M., Pilarova, E., Plackova, L., Pospisil, P., Dolezal, K., and Spundova, M. (2018).** The interplay between cytokinins and light during senescence in detached *Arabidopsis* leaves. *Plant Cell Environ* **41**, 1870-1885.
- Spundova, M., Strzalka, K., and Naus, J. (2005a).** Xanthophyll cycle activity in detached barley leaves senescing under dark and light. *Photosynthetica* **43**, 117-124.
- Spundova, M., Sloukova, K., Hunkova, M., and Naus, J. (2005b).** Plant shading increases lipid peroxidation and intensifies senescence-induced changes in photosynthesis and activities of ascorbate peroxidase and glutathione reductase in wheat. *Photosynthetica* **43**, 403-409.
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