

## Evaluation of bachelor thesis (reviewer's form)

Author of the thesis: Jiří Hermann

Title of the thesis: Root–shoot Junction (Collet) Development

### A. Evaluation of individual aspects of the thesis (mark X one of the options)

1. The character of the thesis (BT) and its structure	
x	A - proportionate, corresponds to the scope of BT and to the significance of individual parts
	B - unbalanced, the structure is not logical or the extent of individual parts does not correspond to their importance
	C - satisfactory, the extent of some parts is insufficient
	<b>N - insufficient</b>

2. Scientific correctness	
x	A - excellent, no serious comments
	B - very good, with minor imperfections (ambiguity of interpretation, errors in formulas or chemical nomenclature, incomplete description of methods or results)
	C - satisfactory, with numerous minor defects
	<b>N - unsatisfactory, with serious mistakes</b>

3. Correctness of the literature resources survey	
x	A - without objections, all literary resources properly cited, the total number of resources corresponds to the scope of the BT
	B - satisfactory, with occasional nuisances, especially in the reference placement, or with a lower total number of citations
	C - with more serious mistakes, such as "non-standard" references to textbooks, lectures, web pages, or the sporadic omission of a link to the downloaded data source
	<b>N - unsatisfactory, very few references, or with possible features of plagiarism, references to the source data frequently neglected</b>

4. Language standard	
x	A - excellent, the work is well-written and comprehensible, without grammatical / spelling mistakes
	B - very good, unique stylistic awkwardness, grammatical / spelling mistakes
	C - sufficient, more frequent stylistic awkwardness, frequent grammatical / spelling mistakes, rare sentences difficult to understand or ambiguous formulations
	<b>N – unsatisfactory, frequent serious mistakes</b>

5. Formal and graphical level of the thesis	
x	A – excellent, without spelling mistakes / text formatting errors
	B – very good, unique mistakes in reference format, misspellings, missing abbreviation, etc.
	C – satisfactory, with unique considerable mistake (such as text page skip) or multiple minor bugs
	<b>N - unsatisfactory, frequent serious mistakes</b>

Optional word comment (to points 1. - 5.):

Jiří Hermann's bachelor thesis has 39 pages and a standard structure. There are no missing parts - abstracts, keywords and a list of abbreviations are included. The text itself is divided into an introduction and three main chapters. In the two-page introduction, the student explains in detail the content and questions to be covered in each chapter. This delineation is important because the thesis omits some aspect of the root-shoot-junction, especially the remodelling of the vascular tissues between the root and the stem in this region. I think it would be useful to emphasize again in the introduction that the thesis will mainly deal with the model plant *Arabidopsis thaliana*, which is only mentioned in the abstract.

The thesis is written in a dense style that is more like a diploma thesis discussion. The student's interest in the topic is evident. He repeatedly proposes his own experiments and research directions based on the information gathered from the literature, which I appreciate. I have only minor concerns about scientific accuracy. The text often refers to the surface cell layer of the embryo as the epidermis, when it is the protoderm. Sometimes the terms RHJ (root-hypocotyl junction) and RSJ (root-shoot junction) are confused unnecessarily, although the relationship between these two terms is explained. In some parts of the text, where information does not come from *Arabidopsis*, the plant species could be mentioned (e.g. the information on the stimulatory effect of auxin on the initiation of adventitious root formation, given on p. 21, comes from a study on *Vigna* plants, but is included with data from *Arabidopsis* without mentioning this fact, which is somewhat misleading).

In some places the information is too brief and a more detailed explanation of the phenomenon described would be useful. For example, the sentence on page 13 "Plant multicellular bodies evolved a special way of intracellular communication that is not present in animals (nanotubules are not real analogues)". It is clear that nanotubules are being contrasted with plasmodesmata, but a brief explanation of their meaning and a description of the structure of nanotubules would make things easier for the reader. Another example is on page 19, where the "possible phenotype" of *monopteros* mutants is described as the loss of a primary root and one cotyledon. A little further down in the text, it is stated without further explanation that *monopteros* mutants lack a primary root and hypocotyl. Clarity would benefit from a more detailed explanation of this variability. The last example is part of the sentence on page 23 "...the highly reduced embryo of orchids - protocorm.", here without further explanation. I think a brief explanation of the term protocorm and its relationship to the globular embryo in orchid seeds would be appropriate here.

The thesis includes 124 references, which is quite sufficient for this type of work. It uses review articles to a reasonable extent. Some parts of the text with more general 'textbook' information should perhaps be supported by more citations (e.g. the first paragraph on page 18 or the first half of page 13, which is completely devoid of references). References include very recent works as well as works from 1880 and 1878. However, these old sources are available at the web addresses given, so I assume the student has read them. The references are properly cited. I have done a random but careful check of the sources listed and have found no major discrepancies, except that the references Brumfield 1943 (p. 6) and Li et al. 2023 (p. 22) are missing from the reference list.

The thesis is written in English and the student states that he has used ChatGPT to optimize the grammar and style. For this reason, and because I am not a native speaker, it is somewhat difficult for me to evaluate the linguistic aspect of the thesis. However, I find the final text to be comprehensible and without major stylistic and grammatical problems. Occasionally I found minor errors (mostly typos - e.g. the repetition of hypophesis instead of hypophysis and a typo in the Latin name of a plant species).

The formal aspect of the work is of a quite adequate standard. The thesis contains 10 carefully designed figures, all of which are properly referenced in the text and have detailed captions. In the case of Figure 4, the caption could have also stated that it is the work of the author, although this fact is mentioned in the text. I found some abbreviations that are not explained in the text or in the list of abbreviations (e.g. PIN, SNARE, Arf GTPase).

Finally, I would like to emphasize that I appreciate the fact that the student openly declares the use of AI tools in the preparation of the thesis and I leave further consideration of this fact to the defence committee. Overall, I consider the bachelor thesis to be good and, despite of some criticism mentioned above, I propose a grade of excellent.

## B. The defense

### ***Reviewer's questions for the student (mandatory part of the report!)***

On page 4, you compare the number of layers of the cortex of the primary root and the hypocotyl and state that the hypocotyl has an extra outer layer that is unique to it compared to the root. In my opinion, this does not correspond to Table 1, which seems to suggest that there is an extra inner layer. Can you please clarify?

What is the cause and significance of endoreduplication in the hypocotyl (see page 21)? How frequent it is?

Opinion on the correction(s) of errors:

Errata / correction in the text **IS NOT** the requirement for the thesis acceptance.

## C. Overall assessment

I recommend the thesis to be accepted for further proceedings: **YES**

Reviewer's final classification proposal: excellent

(1 - excellent; 2 - very good; 3 - good; 4 - unsatisfactory/failed)

Date: 25.5.2024

Name and surname, signature of the reviewer (according to SIS): RNDr. Edita Tylová Ph.D.