



Přirodovědecká
fakulta
Faculty
of Science

Jihočeská univerzita
v Českých Budějovicích
University of South Bohemia
in České Budějovice

OPPONENT'S REVIEW ON BACHELOR/DIPLOMA* THESIS

Name of the student: Anna Marie Mikulecká

Thesis title: Diversity of mycorrhizal communities in roots of selected grassland species

Supervisor: doc. RNDr Marie Šmilauerová, Ph. D.

Referee: Mgr. Martina Vašutová, Ph.D.

Referee`s affiliation: Department of Botany, Faculty of Science, University of South Bohemia

	Point scale ¹	Points
(1) FORMAL REQUIREMENTS		
Extent of the thesis (for bachelor theses min. 18 pages, for masters theses min. 25 pages), balanced length of the thesis parts (recommended length of the theoretical part is max. 1/3 of the total length), logical structure of the thesis	0-3	2
Quality of the theoretical part (review) (number and relevancy of the references, recency of the references)	0-3	1
Accuracy in citing of the references (presence of uncited sources, uniform style of the references, use of correct journal titles and abbreviations)	0-3	2
Graphic layout of the text and of the figures/tables	0-3	2
Quality of the annotation	0-3	2
Language and stylistics, complying with the valid terminology	0-3	1
Accuracy and completeness of figures/tables legends (clarity without reading the rest of the text, explanation of the symbols and labeling, indication of the units)	0-3	2
Formal requirements – points in total		12
(2) PRACTICAL REQUIREMENTS		
Clarity and fulfillment of the aims	0-3	1
Ability to understand the results, their interpretation, and clarity of the results, discussion, and conclusions	0-3	1
Discussion quality – interpretation of the results and their discussion with the literature (absence of discussion with the literature is not acceptable)	0-3	1
Logic in the course of the experimental work	0-3	2

* Choose one

¹ Mark as: 0-unsatisfactory, 1-satisfactory, 2-average, 3-excellent.

Completeness of the description of the used techniques	0-3	2
Experimental difficulty of the thesis, independence in experimental work	0-3	2
Quality of experimental data presentation	0-3	2
The use of up-to-date techniques	0-3	2
Contribution of the thesis to the knowledge in the field and possibility to publish the results (after eventual supplementary experiments)	0-3	2
Practical requirements – points in total		15
POINTS IN TOTAL (MAX/AWARDED)	48	(27)²

Comments of the reviewer on the student and the thesis:

The presented bachelor thesis deals with a very interesting topic - ecology of arbuscular mycorrhizal fungi. The development of this field was enabled only recently thanks to the development and cost reduction of molecular methods.

The author appropriately combines classical and molecular methods, which allowed her to know these very interesting organisms as real living observable objects and not just nucleotide sequences and names.

Unfortunately, I have the impression from the whole thesis that the author did not use the potential that the studied topic offered, and especially theoretical parts, thinking about the study and subsequent discussion is rather weak.

The whole problem starts at the beginning, when the author provides some basic information about arbuscular fungi without targeted presentation of existing knowledge gaps and explaining the importance and significance of her work. Research questions are relevant, but do not build on the previous text. There is almost nothing about possible host specificity or preference. The promising chapter "host species for AMF" is very brief and general. It is not clear how is the species richness of AMF in grasslands and forests related to studied topic (p. 3, l. 7). Also, it is not explained, why the species composition of AMF of individual plants was not analyzed, although the data must be available. The aims of the work are presented as a personal benefit for the author rather than research goals. The inclusion of an independent evaluation of the same experiment by P. Šmilauer without any explanation is really strange to me. (Academic titles of people are usually not used in scientific texts). The easy solution would be to describe available methods suitable for AMF quantification in the introduction, including advantages and disadvantages of methods based on personal experience and expert assessment and so to explain this part of the aims. Including hypothesis would be definitely helpful in data interpretation.

To cite a rather old popularization Czech book instead of recent scientific works seems somewhat strange, similar to using the Figure 1, which is somewhat redundant in the work and, moreover, outdated. In addition, it is referred to very loosely in the text without explaining the issue (p. 1, 9). The abbreviation AMF should be explained (p. 2, 2). Also, it should be explained how the phylogenetic structure of AMF communities changes along a gradient from more ruderal host plants.... . It is also not clear why to evaluate individual AMF structures separately. An interpretation of the presence of individual AM structures is given firstly in the discussion. The methodology lacks information on the year of sample collection, temperature of drying and storage of roots, number of evaluated roots per plant (both visually and by DNA isolation), and approximate number of observed fields under microscope. The reference of WANDA primer is missing. It is not

² Enter the number of points awarded.

clear whether AML 2 contained a barcode. To describe a PCR mixture for 8 samples is really unusual for me. Mostly the composition of one reaction is published. The actual arrangement depends on the laboratory and are not considered to affect the results. The producer of Phusion polymerase is not mentioned. It is not clear how triplicates were processed, what was an approximate concentration of the final product. Such a really brief explanation of Illumina sequencing is not very useful for readers and the reference is not very relevant (p. 14, l. 5). It is not explained why up to 1000 sequences per sample and later up to 400 sequences per sample were used for VTX table.

In results, I would appreciate a link to supplementary data, where primary data on quantification and table of virtual taxa would be included. Concerning discussion, although differences in the state of samples of grasses and forbs are interesting, I would include this information only if it could affect the results. I also miss a clear conclusion on the evaluation of the same samples by two researchers. The results of *Poa angustifolia* are certainly interesting, but I did not find an attempt at interpretation. Comparing the main results with only two studies, one of which is the paper of the supervisor, is not very convincing. At least some theoretical hypotheses could be discussed. The statement that the presented results from 14 plant species is closer to the reality than these from 8 plant species is too optimistic with regards to the plant species richness and diversity of habitat types. The sentence (in conclusion, p. 29, l. 3) that the composition of the AMF community was analyzed, is misleading, because only species richness was evaluated.

Suggestions and questions, to which the student has to answer during the defense.

Mistakes, which the students should avoid in the future:

Why is it necessary to study the diversity of arbuscular fungi in individual plant species? Is there any practical use of this knowledge?

Are there any methods to quantify arbuscular fungi other than morphologically?

What was the reason for choosing the plant species that were studied?

Is it possible to estimate, how specific were selected primers, i.e. what was the percentage of AM sequences per sample?

Could be a species richness of virtual taxa affected by primers selection?

How differ grasses and forbs from the point of view of arbuscular fungi?

Conclusion:

In conclusion, I

recommend / do not recommend*

the thesis for the defense and I suggest the grade good .³

In **České Budějovice** date **12th June 2021**

Martina Vašutová

³ You can suggest a grade, which can be modified during the defense based on reviewer is not present at the defense, the grade will not be counted. Grades: Unsatisfactory/failed (4).