

Master's (Mgr.) Thesis Review

Thesis:

Production and periodicity in the emergence of cercariae of *Diplostomum* spp. (Digenea) from snails *Radix lagotis* (Lymnaeidae)

Candidate:

Bc. Tereza Vyhřídálová

Review:

In this Master's thesis, the candidate Bc. Tereza Vyhřídálová presents a study on the emergence patterns of *Diplostomum* spp. cercariae from a lymnaeid snail species under different experimental conditions and in different seasons.

First and foremost, I would like to congratulate the candidate on her extensive and thorough work that combines laboratory and field experiments. Such experimental approaches require careful planning, meticulous implementation and often a certain degree of creativity and improvisational skills when dealing with unexpected challenges.

Although cercarial emission patterns have long been of interest and the last decade has seen a rise in studies investigating the contribution of these free-living parasite stages to biotic productivity and their important role in food webs, many species-specific emission patterns and transmission strategies remain not fully understood. Trematodes of the genus *Diplostomum* constitute important pathogens of fishes, including in aquacultures. Therefore, the study addresses a relevant question.

Aquatic Biology

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The study design is suitable and clearly laid out; material and methods are described in good detail and allow replicates and follow-up studies for comparisons, e.g. of similar host-parasite systems, and the results are analysed using sophisticated statistical approaches. The study's findings are discussed appropriately and compared to results from other studies, including from different parasites, such as *Trichobilharzia* sp. I appreciate the outlook at the end of the discussion. The overall presentation and illustrations are very good and helpful; the English can be improved but is understandable and adequate. Altogether, this thesis presents an interesting and relevant study that I enjoyed reading.

There are, however, some points that should be addressed:

- I am critical about the study's ability to accurately test for intra- and interspecific variation due to the very low samples sizes of individual *Diplostomum* lineages in each experimental season (e.g. only one *D. mergi* and one *D. parviventosum* isolate are available in the September and May samples, respectively). In particular, since the results show high variability of cercarial output rates between individual infected snails within each species, I would recommend a very cautious interpretation of these results.
- One page 21, you state that, you were "specifically interested in the effect of [...] type of experiment on the emergence rates of cercariae" (i.e., field vs. laboratory vs. incubator design). Accordingly, this should be explicitly stated as an official aim in the last paragraph on page 5.
- In each season, the same snails were used in all treatments consecutively (i.e. field, laboratory, incubator experiment). Table 4 shows an increasing snail mortality within each season from treatment to treatment, probably due to the stress of the individual experiments and snail handling. Any noticed patterns in cercarial emergence (or absence thereof) might therefore be strongly influenced by this non-random sequence of treatments. Do you think the results would look differently, if

the sequence of treatments was reversed (i.e. incubator, laboratory, field experiment)?

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- I am wondering, if there were clear hypotheses? Although probably not necessary for a MSc thesis, many journals publishing experimental studies will require clearly stated hypotheses that can be tested and accepted or rejected. I absolutely see great value in well-conducted descriptive studies but this might be something worth considering, when submitting a manuscript of this study to a journal.

Furthermore, I have a few more general questions:

- Apart from the temporal release patterns discussed in this thesis, could you name some other adaptations of trematode cercariae that maximise the parasite's chance of a successful target host encounter?
- If you were to come up with and design a follow-up study to this work, what would it be, and why?
- Could you briefly explain to a non-biologist why it is important to study parasites in ecosystems, apart from the obvious medical importance of some individual species?

Concluding statement:

I recommend this thesis by Tereza Vyhliđalová for defense.



Aarhus, 11 Jan. 2020 Dr. Christian Selbach