

The evolution of host - parasite interactions

The Essay

Fall term (Sept. – Dec.)

Course instructors: Dieter Ebert & Louis Du Pasquier

This document contains more details about the “Essay” required as part of the course in “The Evolution of Host-Parasite Interactions”.

Task: Write an essay about the evolution of a disease/parasite. Find a host – parasite system you find interesting and write a review based on scientific literature. The review needs to follow the rules of good scientific practice.

Parasite is used here in its widest sense. Any parasite can be chosen for the essay. There are few exceptions:

- Every student should write about a different parasite. We keep a list of topics, which will be shown in class.
- Do not write an essay about a parasite you worked on before or you plan to work on in your master theses.

Literature search: To find articles about the evolution and/or population genetics of your parasite system I suggest to use Pubmed, Web of Science and google scholar. Citations to web-pages are not accepted, unless they are credible sources with a high reputation (e.g. genbank).

The Essay

- should be about 4 pages,
- written in english,
- have a review style and
- should contain a full list of literature.

The essays will be checked for plagiarism!

Deadlines: The deadline for submitting the topic of the essay and for submitting the essay will be announced in the course.

Submission: Submit a .pdf by Email to D. Ebert and hand-in a printed copy to Dieter Ebert.

Structure of the Essay:

Title

Author (names and affiliation)

1. Abstract/ summary

2. Introduction (Background to the parasite/disease, epidemiology, disease burden, transmission, taxon, etc.)

3. Main part covering aspects of the evolution of the parasite/disease.

This may include phylogenetic considerations, population genetics, history, evolution of resistance, coevolution with the host, or other points of interest.

4. Outlook/conclusion

5. References

The main part should make up not less than $\frac{3}{4}$ of the text.

Style of References:

I recommend the following style for the reference list (the doi number is not necessary, but nice to have):

Antonovics, J., Boots, M., Ebert, D., Koskella, B., Poss, M. and Sadd, B. M. (2013). The Origin of Specificity by Means of Natural Selection: Evolved and Nonhost Resistance in Host-Pathogen Interactions. *Evolution*, 67:1-9. doi: 10.1111/J.1558-5646.2012.01793.X.

Ben-Ami, F., Mouton, L. and Ebert, D. (2008). The effects of multiple infections on the expression and evolution of virulence in a *Daphnia*-endoparasite system. *Evolution*, 62: 1700-1711.

Bento, G., Routtu, J., Fields, P. D., Bourgeois, Y., Du Pasquier, L. and Ebert, D. (2017). The genetic basis of resistance and matching-allele interactions of a host-parasite system: The *Daphnia magna*-*Pasteuria ramosa* model. *PLoS Genetics*, 13. doi: 10.1371/journal.pgen.1006596.

Broman, K. W. and Sen, S. (2009). *A Guide to QTL Mapping with R/qtl*. Springer, New York.

Combes, C. (2001). *Parasitism: The Ecology and Evolution of Intimate Interactions*. University of Chicago Press.

Corradi, N., Haag, K. L., Pombert, J. F., Ebert, D. and Keeling, P. J. (2009). Draft genome sequence of the *Daphnia* pathogen *Octosporea bayeri*: insights into the gene content of a large microsporidian genome and a model for host-parasite interactions. *Genome Biology*, 10, R106.

Dobson, A., Molnar, P. K. and Kutz, S. (2015). Climate change and Arctic parasites. *Trends in Parasitology*, 31: 181-188.

Falconer, D. S. and MacKay, T. F. C. (1996). *Introduction to Quantitative Genetics*, 4. edition, Longman, Harlow, UK.

Woolhouse, M. E. and Antia, R. (2008). Emergence of new diseases. In *Evolution in health and disease* (2nd Ed.). (eds. Stearns, S. C., and Koella, J. K.), pp. 215-228. Oxford University Press, Oxford, UK.