Infection and Spore Yield of Daphnia Microsporidian

Hannah O'Grady[1], Kathleen Galbraith[2], Alex Strauss[2]

[1]Mount Holyoke College, [2]Odum School of Ecology, University of Georgia

Introduction

- An important question in disease ecology is how well parasites can infect multiple hosts and the tradeoffs between specialism and generalism.
- Our lab discovered a potentially novel microsporidian that was infecting the ovaries of multiple types of zooplankton in the superorder *Cladocera* during field work.
- We wanted to use this microsporidian to study generalist diseases and the cost of that generalism.

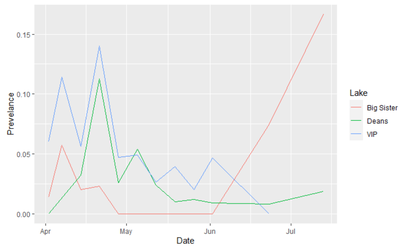

Figure 1. Infection prevalence in *D. ambigua* from different lakes.

Objectives

1. Determine if the microsporidian can infect *Cladoceran* in the lab and if so
   a) Determine if the microsporidian more successful at infecting one species than the other.
   b) Determine if the microsporidian was more successful at infecting hosts from the same lake that the microsporidian was collected from.
2. Determine if spore yield in the field varies across species, lake and time.

Methods

- Isoclonal lines of two species of *Daphnia* each from two different lakes were separated into groups and the groups were then exposed to 900 spores per mL of spores gathered from each species of *daphnia* from each lake and one group of each isoclone was unexposed and data on births and deaths was collected.
- Two additional species of *Cladocera* were split into groups and either exposed to spores from one lake or left unexposed and data on births and deaths was collected.
- Additional *Cladocera* of the studied species were exposed to an immense spore load (+ 5 million spores per mL)
- Spore yields were gathered from *Cladocera* from the field.

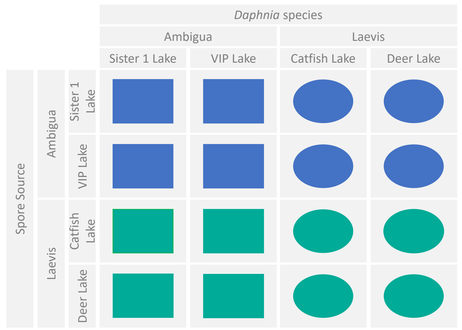

Figure 2. Diagram of experimental setup.

A potentially novel microsporidian infects *Daphnia* in the field but not in the lab. Spore yields of the parasite in the field varied between species.

Uninfected

Infected

Figure 3. Pictures of infected and uninfected *D. ambigua*

Maximum Prevelences of Infected Animals

	Type	Prevelance	Lake
1	D. laevis	0.615	Catfish
2	D. ambigua	0.140	VIP
3	D. parvula	0.067	Deer
4	Simocephalus	0.075	No Name 3
5	Diaphanosoma	0.078	Deans

Figure 4. The maximum prevalence reached by each infected type of *Cladocera* and the lake where maximum prevalence was reached.

Figure 5. Kate doing field sampling in VIP lake.

Results

- 0/1,216 of the exposed *Cladocera* in the lab became infected or showed any significant change from being exposed to the microsporidian.
- Spore yields from *Cladocera* gathered in the field varied between species, and sometimes by day.
- Spore yields did not vary between lakes.

Discussion

- Since none of the exposed *Cladocera* in the lab became infected we hypothesize that there is an intermediate host which is necessary for the microsporidian to complete its life cycle.
- More research will be needed to determine the intermediate host as well as the exact type of microsporidian.

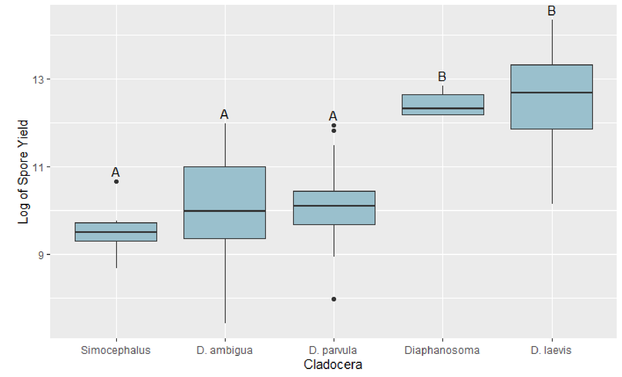

Figure 6. Spore yield of infected species with groups marked A or B being significantly different.

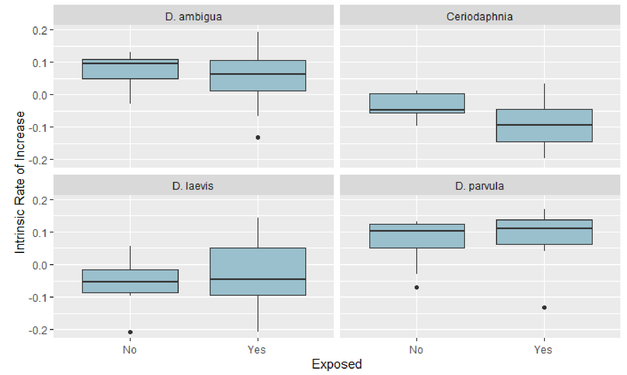

Figure 7. The effect of exposure to spores on the intrinsic rate of growth. There was no significant effect from exposure to the microsporidian on the intrinsic rate of growth of the *Cladoceran*.

Land acknowledgment: We acknowledge that we are on the traditional lands of the Creek and Cherokee people.