No evidence for Density-Dependent Prophylaxis in response to adult crowding in *Drosophila melanogaster*

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Introduction

- Risk of infection is expected to increase due to increase in host population density .
- Increasing population density can be stressful and detrimental to host physiology, making hosts more susceptible to disease outbreaks .
- At higher densities therefore it is beneficial for the hosts to up-regulate immune function in anticipation of greater pathogen pressure: **Density-Dependent Prophylaxis.**
- Immune function of flies changes based on whether they are hosted individually or in uni-sex pair.
- Possibility of Density Dependent Prophylaxis has never been directly tested in *Drosophila melanogaster*

Research Question

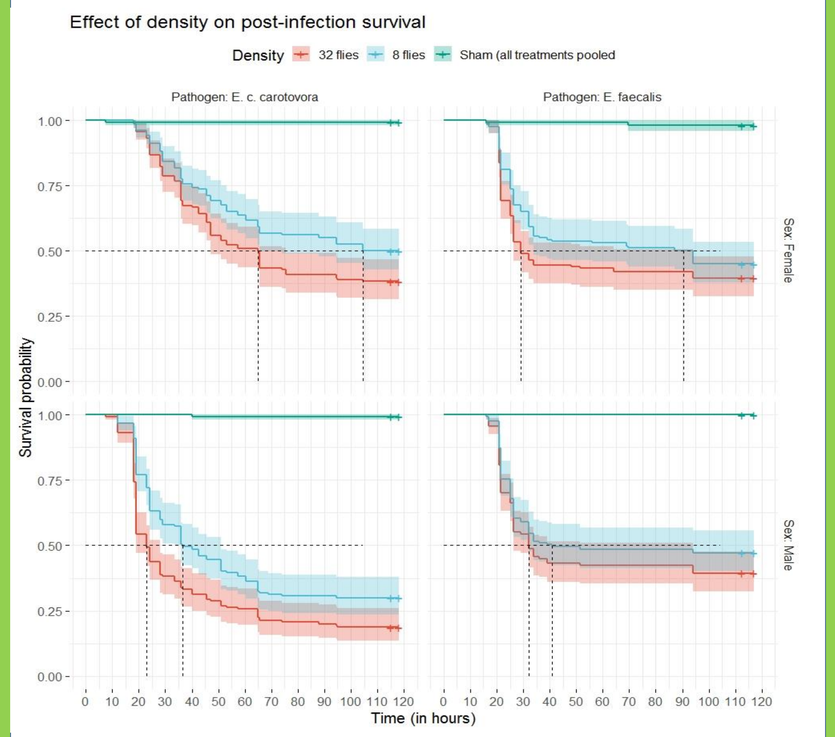
How does manipulating adult density change immune function in *Drosophila melanogaster*?

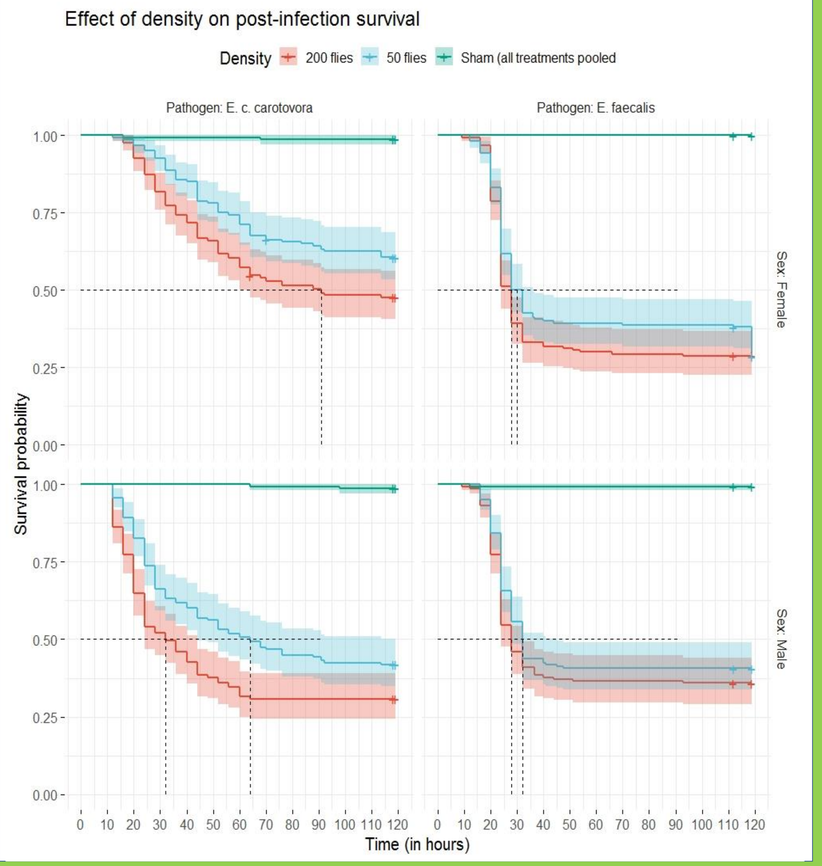
Experimental Design

Eggs were collected from BRB population(Day1) → Conditioning was done on 12th day post egg collection → Infection was done on 14th day post egg collection

2-3-day old adult flies were sorted into fresh food vials (with 1.5-2 mL of food medium) at densities of (8 individuals or 32 individuals) or (50 individuals or 200 individuals) in each vial, in 1:1 sex ratio. The flies were held in these vials for two days, the *conditioning* period. After the conditioning the flies were subjected to infections, and housed at density of 4 males and 4 females per vial. For immunity assays, 20 infection vials were set up per density treatment and 10 sham-infection vials were set up per treatment. The experiment was replicated twice with pathogens *Erwinia c.carotovora* and *Enterococcus faecalis*

Result





- For flies infected with *Enterococcus faecalis*, neither sex nor density treatment had any effect on post-infection survival of the adults
- For flies infected with *Erwinia c. carotovora*,
  - females in general survived better than males, irrespective of density treatment.
  - For (32 adults vs 8 adults), flies conditioned at lower density had significantly greater survival compared to flies crowded at higher density.

Conclusion

we found no indication of induction of Density Dependent Prophylaxis by crowding of adults in *Drosophila melanogaster*. Results suggest that flies at lower densities either have better or equal immune proficiency as the flies at higher densities.

References

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