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## Introduction

- *Wolbachia* is a maternally inherited intracellular endosymbiont
- It is widely known for its reproductive manipulations
- The most common manipulation is CI (cytoplasmic incompatibility)
- Two mushroom feeding *Drosophila* species were used: *Drosophila recens* and *Drosophila subquinaria*
- *D. recens* is infected with *Wolbachia* at ~ 98%, and it causes cytoplasmic incompatibility

### CYTOPLASMIC INCOMPATIBILITY (CI)

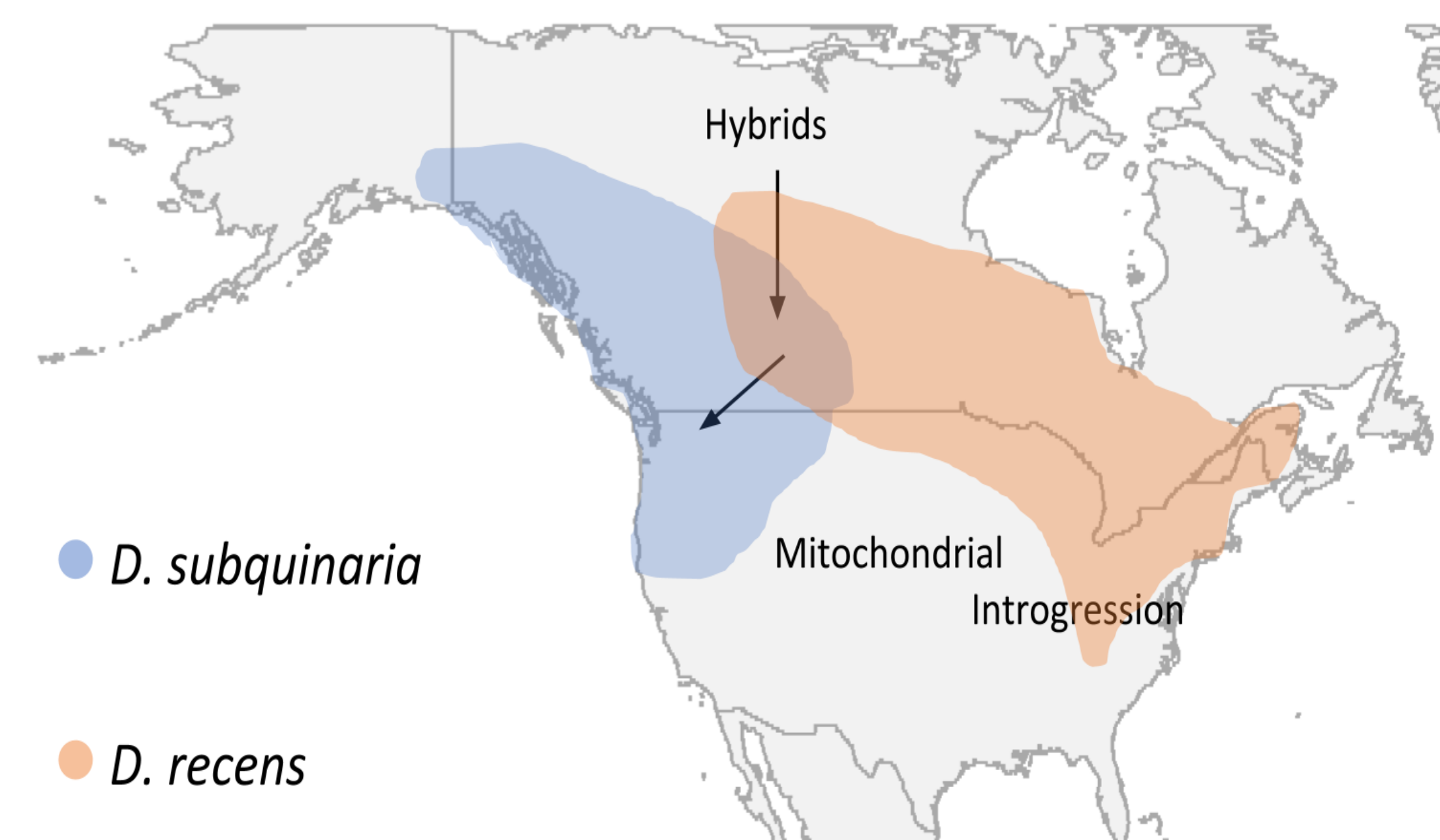
♀	×	♂			
U	×	U	→		✓
I	×	U	→		✓
I	×	I	→		✓
U	×	I	→		✗

● Compatible cross  
 ● Incompatible cross

## Research Questions

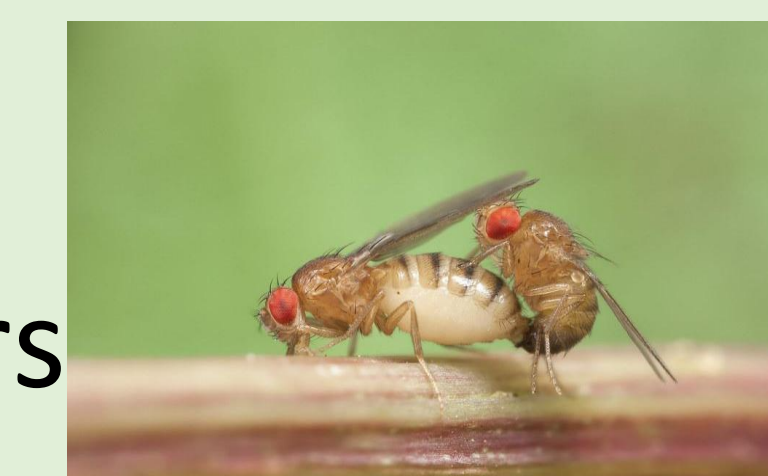
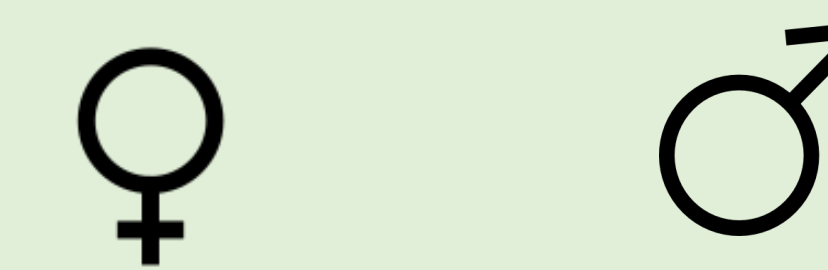
- How does *Wolbachia* affect mate preference in *Drosophila recens* (native host) and *Drosophila subquinaria* (non-native host)?
- Is there a clear mate discrimination between females and infected males in *Drosophila subquinaria*?

## *D. subquinaria* species complex



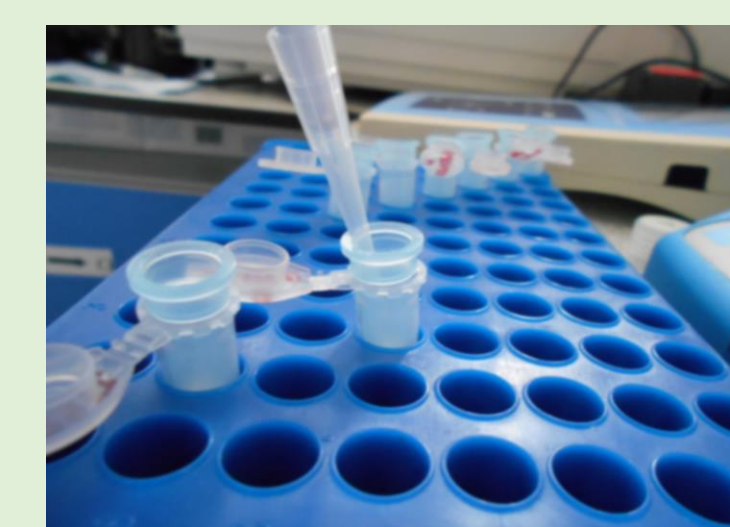
Dyer et al. 2018; Jaenike et al. 2006; Shoemaker et al. 1999

## Methods



Watch for 3 hours

### Test for Wolbachia



- Collect virgin flies, separate by sex
- Set up crosses with one male and one female
- Females put into vials first, then add males
- Crosses observed for three hours and mating was recorded

## 1. *Wolbachia* has no effect on mate preference in *D. recens*

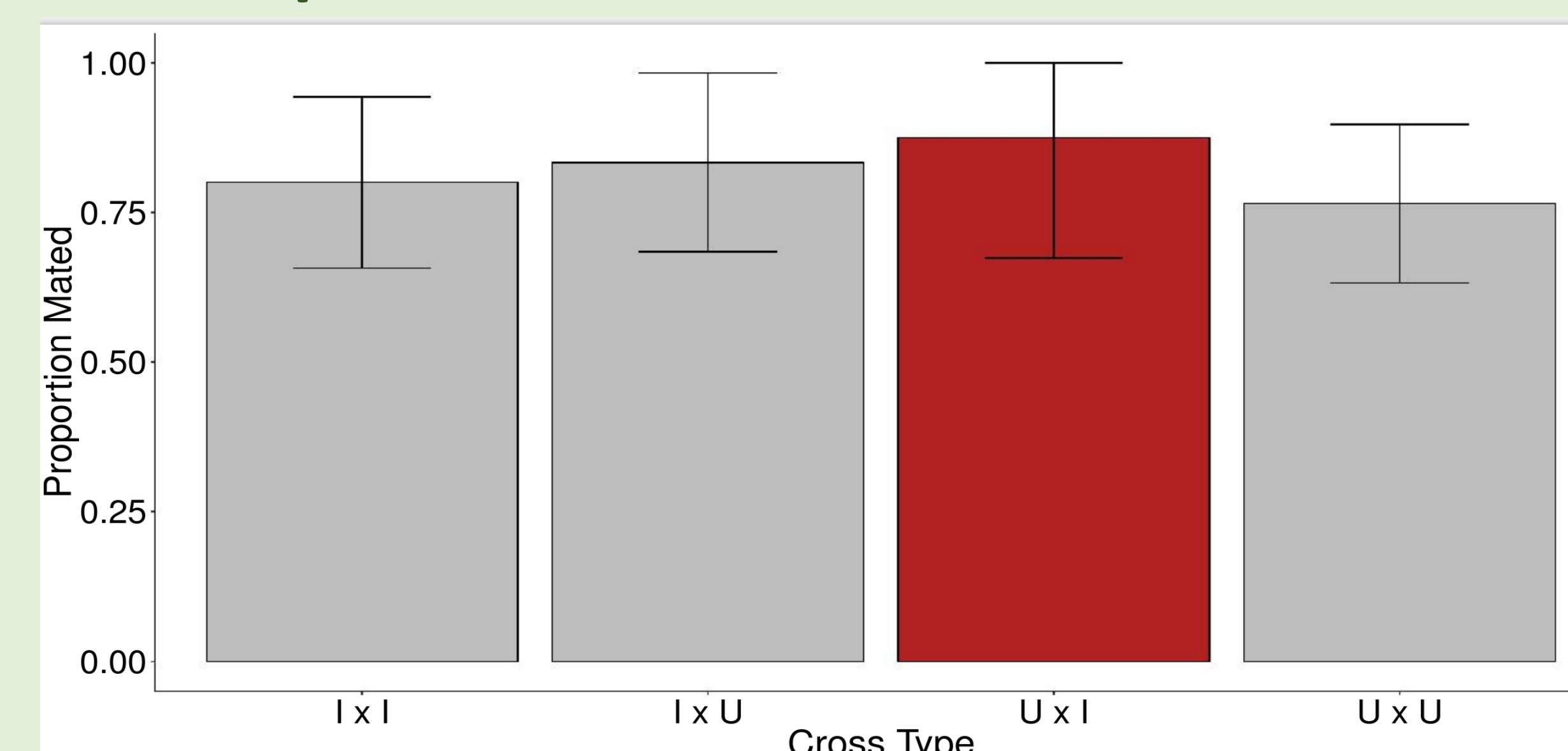


Figure 1. Female by male cross, red shading represent cytoplasmic incompatibility

## 2. *Wolbachia* has a significant effect on mating preference in *D. subquinaria*

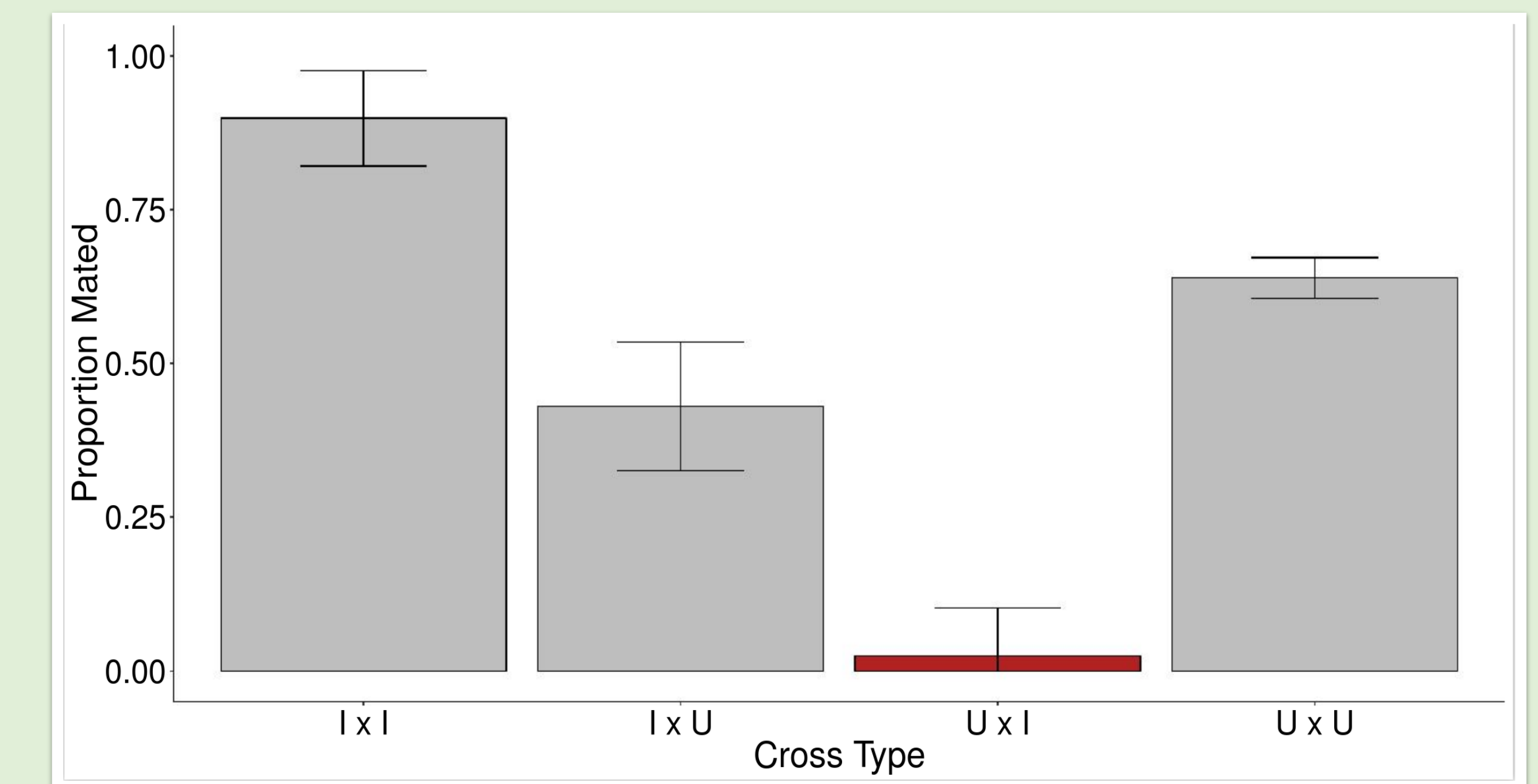


Figure 2. Female by male cross, red shading shows cytoplasmic incompatibility

## Discussion

- In this experiment *Wolbachia* did not affect the mating preference in the native host *D. recens*, which is shown in graph 1.
- In *D. subquinaria*, *Wolbachia* had a huge effect in the mating preference with an uninfected female and an infected male
- *Wolbachia* also affected crosses between infected females and uninfected males, even though this cross does not result in embryonic mortality
- Mating preferences observed in *D. subquinaria* could help prevent *Wolbachia* invasion from *D. recens* into *D. subquinaria*

### Future Directions

- Shared environment
- Investigate mechanism of mate preference
- Cuticular hydrocarbons

### References

Werren, J. H., Baldo, L., & Clark, M. E. (2008). Wolbachia: master manipulators of invertebrate biology. *Nature Reviews Microbiology*, 6, 741. doi:10.1038/nrmicro1969

Shoemaker, D. D., Katju, V. and Jaenike, J. (1999), *WOLBACHIA AND THE EVOLUTION OF REPRODUCTIVE ISOLATION BETWEEN DROSOPHILA RECENS AND DROSOPHILA SUBQUINARIA*. *Evolution*, 53: 1157-1164. doi:10.1111/j.1558-5646.1999.tb04529.x

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