

Geographic variation in *Wolbachia*-induced cytoplasmic incompatibility in the fly *Drosophila recens*

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Introduction

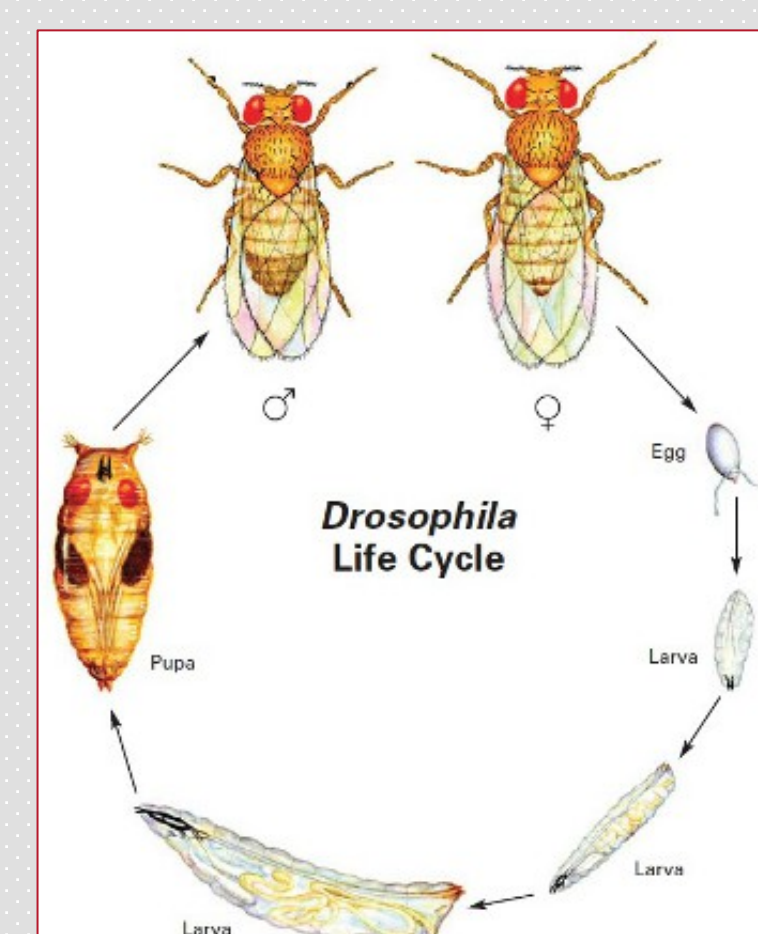
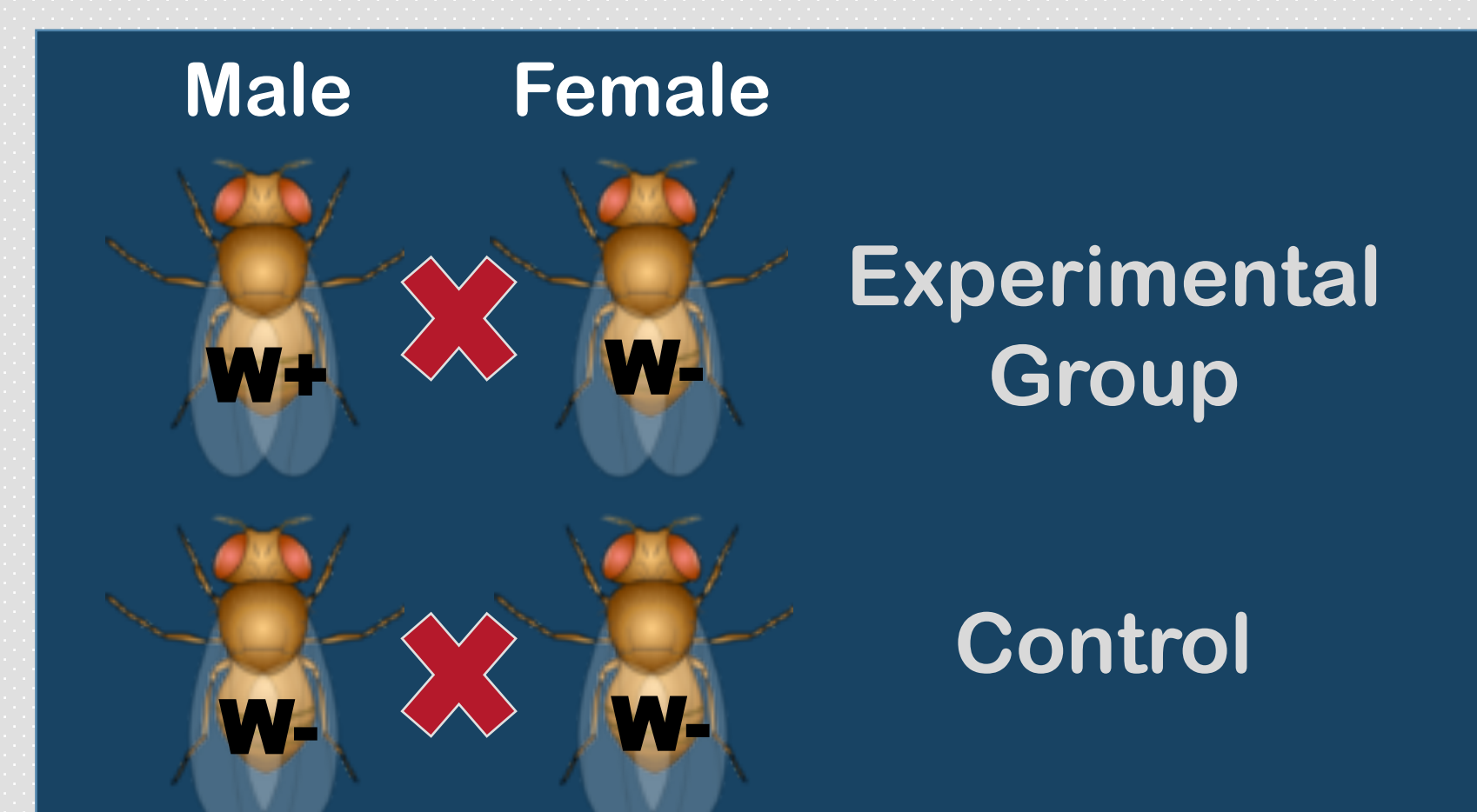
Wolbachia are bacterial parasites that commonly infect arthropods. This parasite is capable of causing many deleterious effects on the progeny of fruit flies that are infected, including cytoplasmic incompatibility.

Cytoplasmic incompatibility occurs when *Wolbachia*-infected males mate with *Wolbachia*-uninfected females. The parasite causes the sperm and egg to be unable to yield viable offspring. Although some offspring are still able to emerge, the percent of healthy larvae produced typically decreases when the paternal parent is infected with *Wolbachia*.

Drosophila recens is a type of fruit fly that is commonly infected with *Wolbachia*. In the laboratory, these flies can be healed of the parasitic infection using tetracycline.

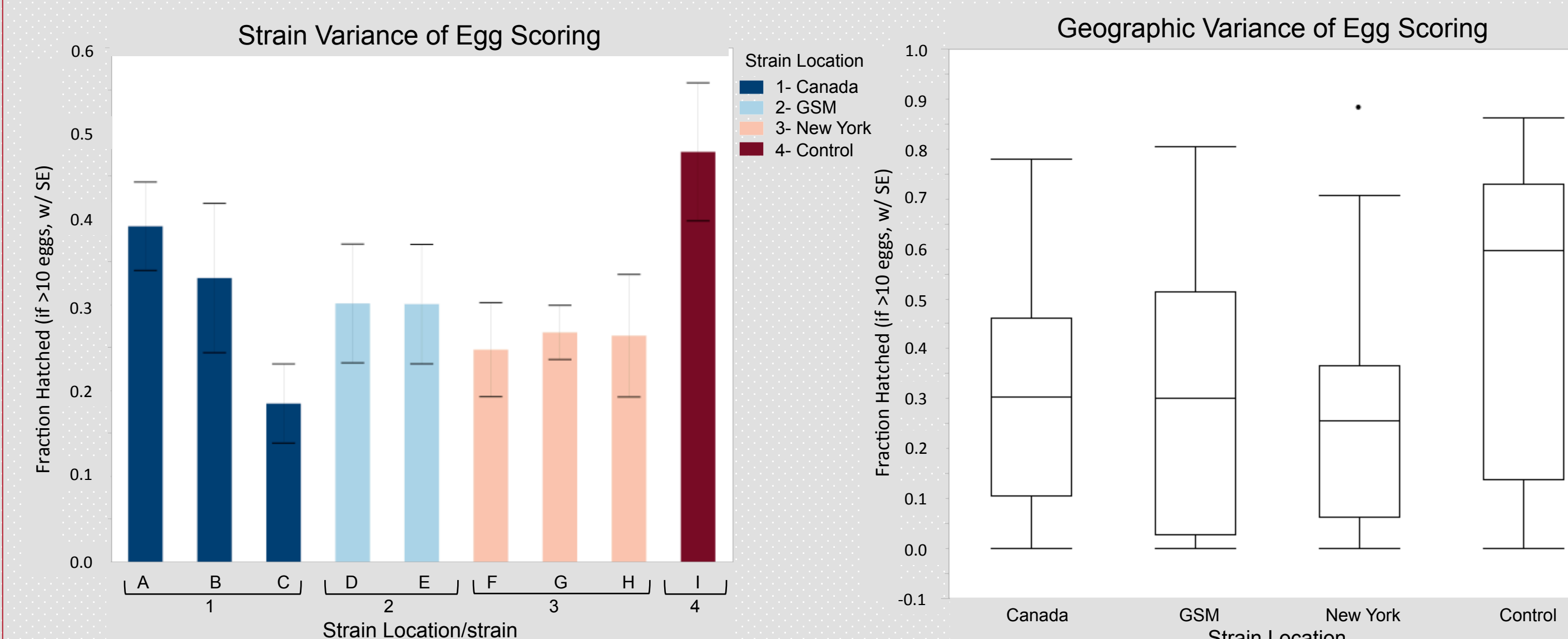
Materials and Methods

1. Virgin, infected males were collected from different strains originating from three locations (Canada, New York, and Great Smoky Mountains) and virgin uninfected females were collected.
2. After aging for 7-10 days, a male and female were placed together in individual vials and observed for copulation.
3. Females were then moved onto mushroom-agar food while the males were set aside for DNA extraction and PCR.
4. Hatched eggs and unhatched eggs were counted over the next 72 hours to measure cytoplasmic incompatibility.
5. The percentage of cytoplasmic incompatibility from the three locations was compared to the control.



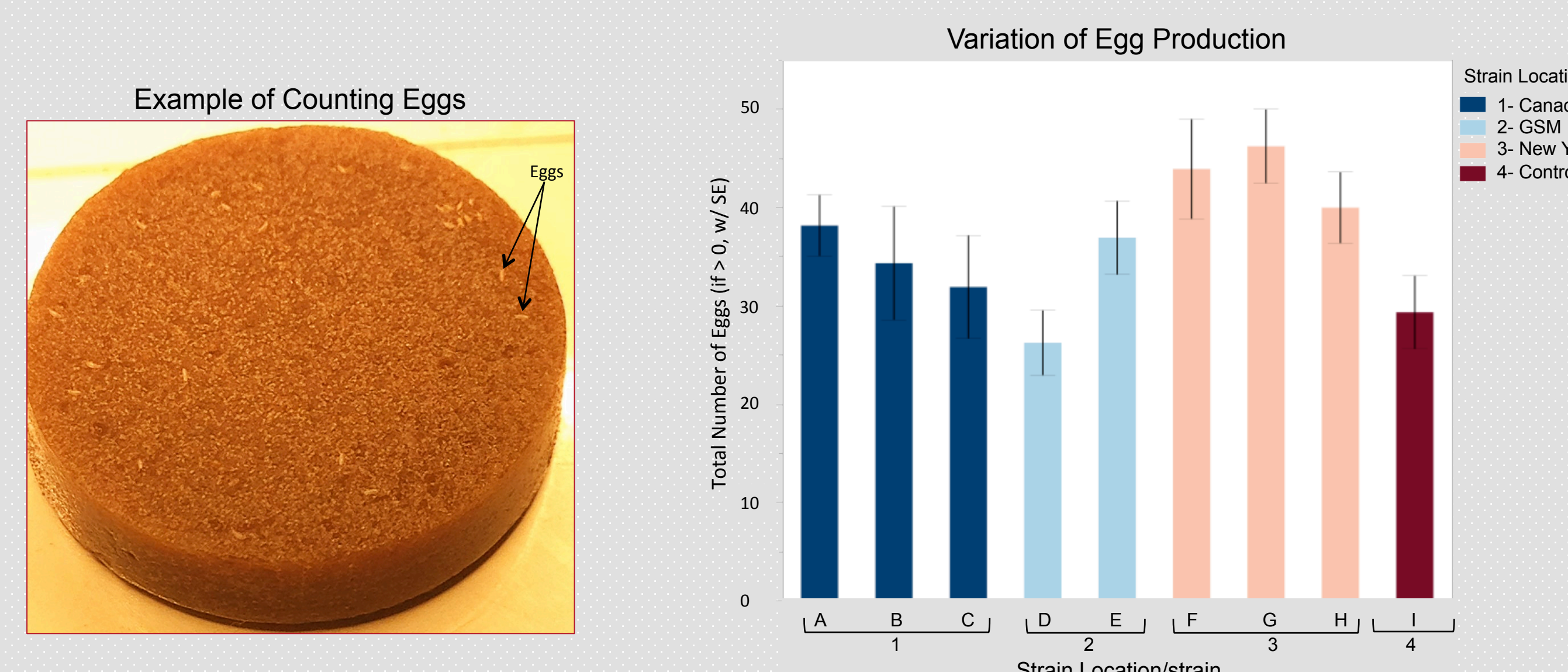
Results

- Overall low hatch rate
- Significant variation* between control and experimental hatch rates
- Consistent hatch rate between locations
- Low levels of CI compared to other studies
- Significant variation* between strain locations for egg production



Effect Tests for Fraction Hatched

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Strain within Strain Location	5	5	.33767961	1.2324	0.2983
Strain Location within Control vs. Experimental	2	2	.04639644	.4233	0.6559
Control vs. Experimental	1	1	.44776201	8.1710	0.0050*



Effect Tests for Egg Production

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Strain within Strain Location	5	5	1555.9376	1.2377	0.2954
Strain Location within Control vs. Experimental	2	2	3017.7641	6.0012	0.0032*
Control vs. Experimental	1	1	772.5316	3.0725	0.0820

Objective

The objective of this research was to compare levels of cytoplasmic incompatibility from three different locations across North America. These three locations are Calgary, Alberta; Fern Lake, New York; and the Great Smoky Mountains.

Conclusion

The low hatch rate in each of the strains would have a detrimental long-term effect on the species of fly.

The higher hatch rate in the control when compared to the experimental shows that the presence of *Wolbachia* is decreasing the fecundity of the fly.

Consistent hatch rates between the geographic locations tested shows that the presence of *Wolbachia* is affecting the flies similarly despite the environment they are in.

In reference to previous work, the percentage of cytoplasmic incompatibility found in this study is low, at about 72%. This lower amount of CI may demonstrate that the effect of *Wolbachia* is not as deleterious as previously determined. It could also show that for CI is not effecting this species as much as others.

Literature Cited

Shoemaker D, Katju V, Jaenike J. "Wolbachia and the evolution of reproductive isolation between *Drosophila recens* and *Drosophila subquinaria*." *Evolution*. August 1999; 53(4):1157-1164.

Werren J, Jaenike J. "Wolbachia and cytoplasmic incompatibility in mycophagous *Drosophila* and their relatives." *Heredity*. September 1995; 75(3):320-326.

Acknowledgements

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