**Aedes aegypti Egg Hatching Behavior**

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**BACKGROUND**

The Dengue Fever Mosquito comprises two divergent forms: an ancestral forest form that bites animals (grey) and a recently evolved domestic form that specializes in biting humans (brown).

The two forms can hybridize in the laboratory but remain distinct in nature and show strikingly different preferences for human vs. animal odor in an olfactometer (see below).

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**OBJECTIVE & HYPOTHESIS**

**OBJECTIVE:** To better understand how *Aedes aegypti* hatching behavior has adapted to human-associated breeding habitats. 4 variables were studied: oxygen level, genotype, batch, and egg age.

**HYPOTHESIS:** *Aedes aegypti* eggs will hatch at higher rates in lower dissolved oxygen levels. Domestic eggs will be more successful at hatching at higher dissolved oxygen levels than forest eggs. A maternal effect will be present: hybrids eggs will behave similarly to eggs of the mother's genotype. Younger eggs will hatch at higher rates than older eggs.

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**METHODS**

- Eggs separated into one of five dissolved oxygen level treatments
- 3 treatment intervals: 2 hours DO treatment, 8 hours DO treatment, 24 hours hatch broth to assess egg viability

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**RESULTS**

**Oxygen Level and Genotype**

T51 (domestic form) and TxU (domestic mother x forest father) genotypes display higher hatch rates at each level of dissolved oxygen than US2 (forest form) and UxT (forest mother and domestic father) genotypes. Dissolved oxygen level appears to have a significant effect on hatch rate, with a threshold of optimal hatching apparent between 55% DO and 70% DO for T51 and TxU genotypes, and between 40% DO and 55% DO for US2 and UxT genotypes. Maternal effect also appears to have a significant effect on hatch rates.

**Batch Variability**

Trial on new batch of eggs performed using same methods as 6.25.18 trial, both on 1-month-old eggs. Hatch rates at 40% DO are lower than expected, but overall trends appear similar across batch.

**Egg Age**

Two trials run on the same batch of eggs, once at 1 week after laying and again at 1 month after laying. Younger eggs show significantly higher hatch rates than 1-month-old eggs at all dissolved oxygen levels. Previously observed trends in oxygen level and genetics remain present.

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**DISCUSSION**

- Oxygen level, genotype, and egg age each appear to have a significant effect on hatch rate. Although variability between batches exist, general trends remain consistent.
- Oxygen level: As oxygen level decreases, hatch rate increases. This trend is consistent across each genotype.
- Genotype: Domestic genotypes are more successful at hatching at each oxygen level. Maternal effects are strong.
- Egg age: Younger eggs are more successful at hatching than older eggs.

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**FUTURE STEPS**

- Additional trials to further assess effect of oxygen level, genetics, batch, and egg age
- Which of these factors has the largest effect on hatch rate?
- Is there variation in hatching behavior within the forest subspecies based on habitat?
- Is there an effect of humidity level on hatch behavior?
- Do genetics play a role in oviposition behavior?

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