



# Sublethal Effects of Low-dose Exposure to Imidacloprid on the American Lobster

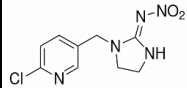
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## Introduction

European salmon farms use imidacloprid as a chemotherapeutant to control sea lice infestations. Prior to consideration in Maine, we wanted to investigate potential effects on the highly valuable non-target species, the American lobster. Lobsters use defensive behaviors to avert predators and compete for resources.

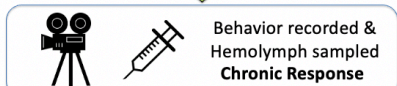
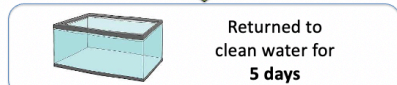
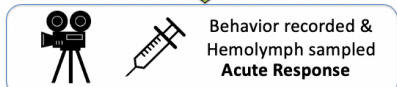
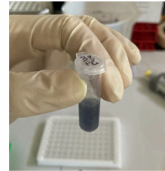
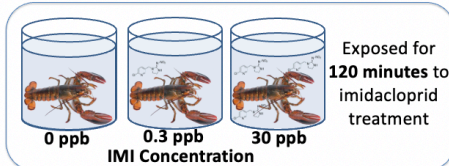


Imidacloprid (IMI)

## Research Question

If used in Maine, would salmon farm imidacloprid effluent affect the behavior and physiology of nearby American lobsters?

## Methods



### Behavioral Endpoints:

- Righting Time
- Tail Flips
- Meral Spread
- Swimmeret Fanning
- Lethargic
- Claw Trembles

### Hemolymph Endpoints:

- L-lactate
- Crustacean Hyperglycemic Hormone (CHH)
- Total Protein

Focus today

### Ecological Significance

Defensive behaviors needed for survival and reproduction

### Economic Significance

Need vitality to be sold in live-market

### Biological Significance

Stress indicators

## Results

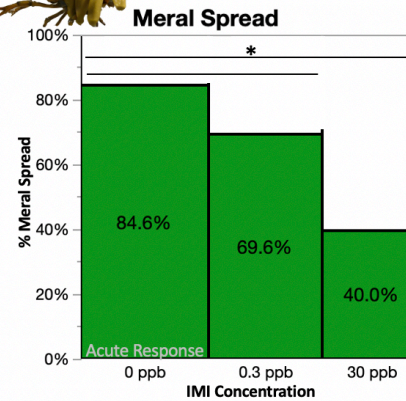


Figure 1. Meral Spread was reduced for 30 ppb IMI lobsters immediately after exposure.

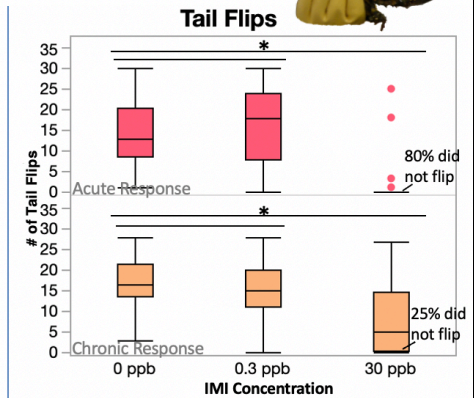


Figure 2. Tail Flipping was reduced for 30 ppb IMI lobsters immediately and 5-days after exposure.

### Crustacean Hyperglycemic Hormone

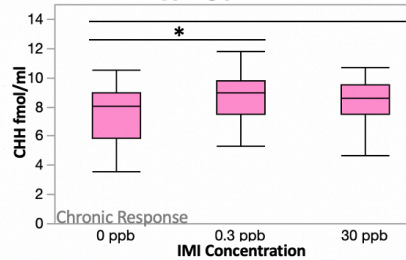


Figure 3. Crustacean Hyperglycemic Hormone was higher 5-days after exposure for 0.3 ppb IMI lobsters.

### Figure Statistics

- Figures with \* indicates statistical significance of  $p\text{-value} < 0.05$ .
- 0 ppb  $n=26$ , 0.3 ppb  $n=23$ , 30 ppb  $n=20$ .

## Discussion

Behaviors of ecological and economic importance are impacted by potential environmentally relevant concentrations of imidacloprid. Interestingly, physiological endpoints overall did not indicate significant changes. This emphasizes the value of observing downstream effects closer to responses of interest.