

Inside the Crabrooms

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Background

→ European Green Crabs (*Carcinus maenas*) are one of the top 100 worst invasive species (Ens et al., 2022)

- ◆ Predator
- ◆ Competitor
- ◆ Habitat disruptor

→ Hairy Shore Crab (*Hemigrapsus oregonensis*) is native to the PNW

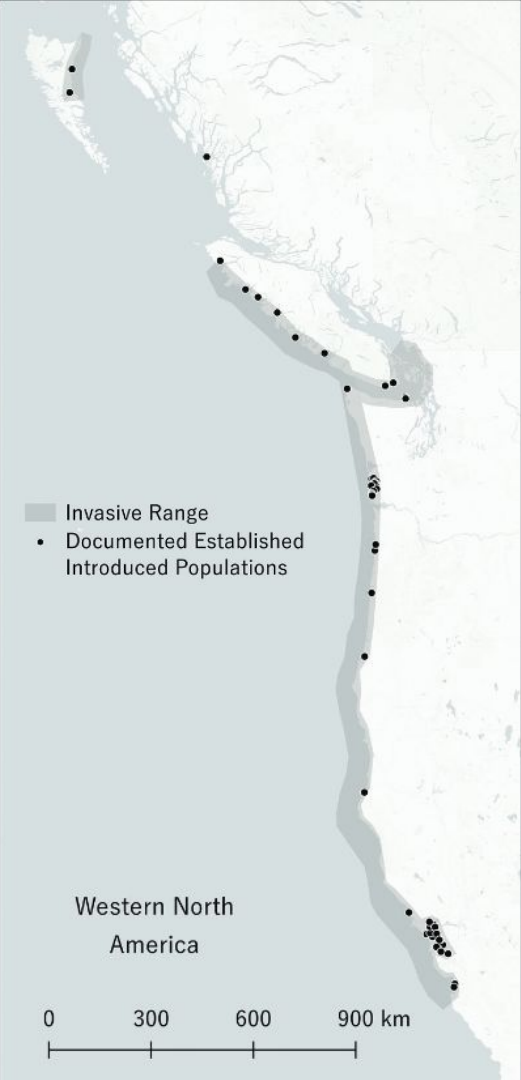
- ◆ Similar range and niche as European green crab invaded areas



European Green Crab

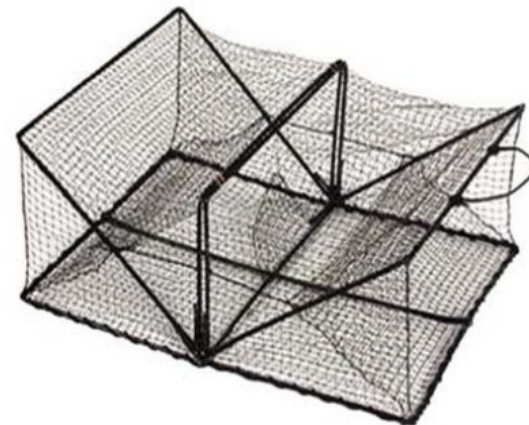


Hairy Shore Crab



Background

- Most commonly used control efforts is trapping (Ens et al., 2022)
 - ◆ Fukui traps
 - ◆ Crab slab
 - Innovative “trap” being tested by the Tulalip tribe (Cauvel, 2024)
- Lots of bycatch in trapping efforts
- Traps cause behavioral and reproductive changes on captured species (Darnell et al., 2010)



Fukui Trap



Crab Slab: NW Treaty Tribes

Research Question:

How do different simulated crab traps conditions affect the stress response of native shore crabs *Hemigrapsus oregonensis*?

H_0 : There is no significant change in stress in *Hemigrapsus oregonensis* when in a simulated classic trap compared to simulated natural traps with or without *Carcinus maenas* exposure.

H_A : There is a significant change in stress in *Hemigrapsus oregonensis* when in a simulated classic trap compared to simulated natural traps with or without *Carcinus maenas* exposure.

H_{A1} : Classic traps induce a higher stress response in *Hemigrapsus oregonensis*.

H_{A2} : Presence of *Carcinus maenas* induces a higher stress response in *Hemigrapsus oregonensis*.



Experimental Variables

- Trap type
 - ◆ Classic fukui trap or natural “crab slab”
 - ◆ Full pots do not fit within the confines of this experiment
 - ◆ Simulate the habitat the pots create within the bins
- Crab species
 - ◆ *Hemigrapsus oregonensis* by itself or in the presence of *Carcinus maenas*



Response Variables

- Stress response
 - ◆ Respiration
 - ◆ Righting time (Schroeder-Spain et al. 2018)
 - ◆ Protein assay of hemolymph at the end of the experiment (in case we kill the crabs)

Control Variables

- Water conditions
- Size of crab (to the best of our ability)
- Sex of crab (to the best of our ability)

Experimental Design

Supplies: 12 *H. oregonensis*, 2 *C. maenas*, 2 rocks, crab trap materials, mesh divider to separate green crab 1 bin for each treatment, simulated environment

Each week (x3):

- Measure righting time of each shore crab
- Sample water and perform resazurin assay: 0 min, 30 min, and 60 min for each bin → measure respiration rate

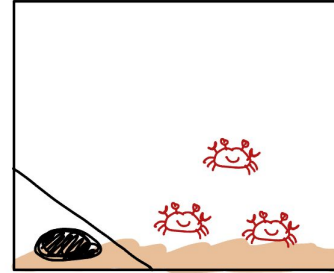
Final week:

- Protein assay with hemolymph extraction

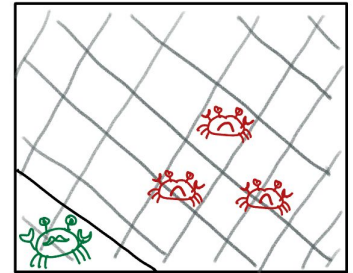
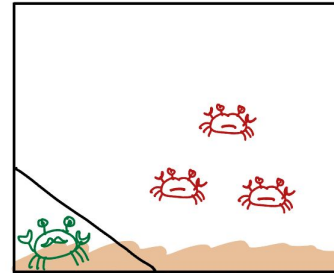
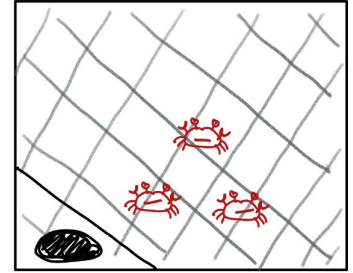
“Natural” trap = crab slabs
Classic trap = Fukui wire traps

4 treatments:

“Natural” trap



Classic trap

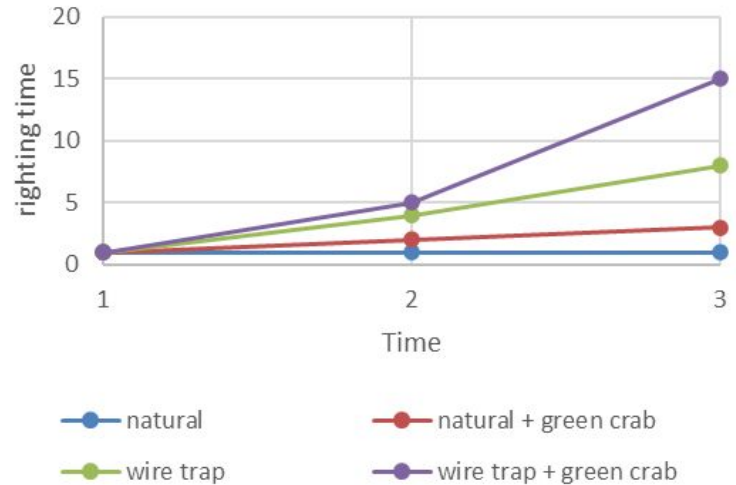
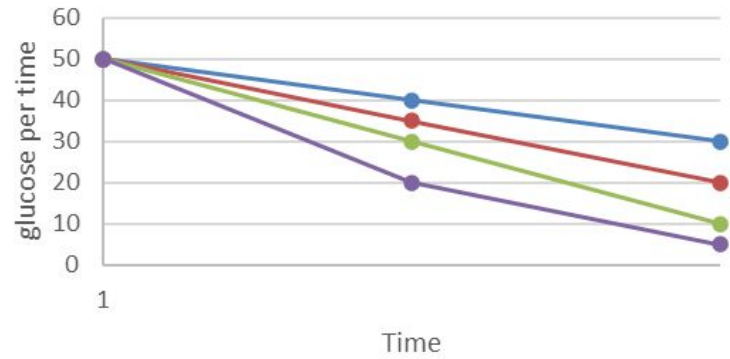
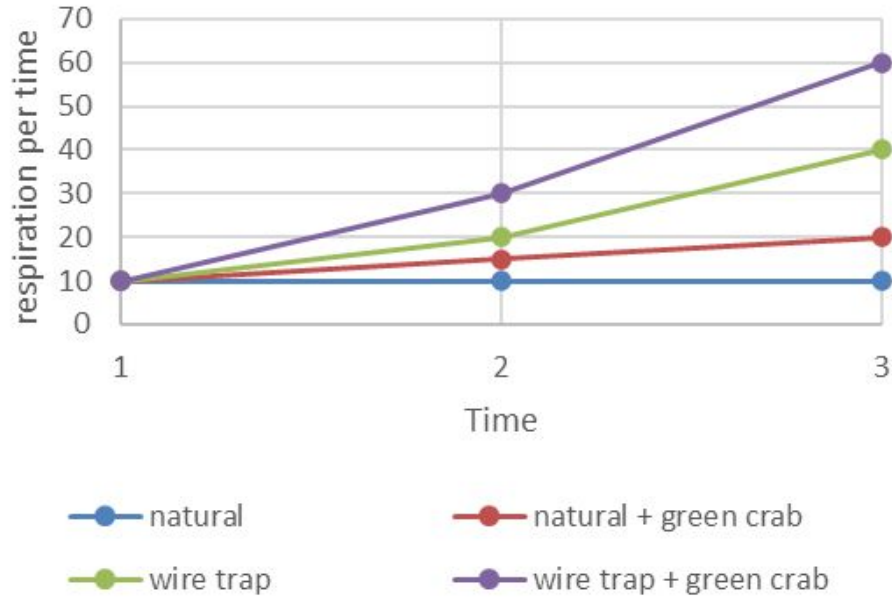


“Natural” trap
with green crab

Classic trap
with green crab



Expected results



Sources

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