Prawn Post Release Mortality Experiment

Experiment Methods

We set 10 traps, let them soak for ~24 hours and pulled them. We immediately placed the prawns into a saltwater filled fish tote.

**Treatment Stage**

We distributed the prawns into (usually) 5 treatment groups (0 minutes, 30 minutes, 60 minutes, 90 minutes, 120 minutes). Each group received a different colour rostrum band. The prawns were left on the boat deck for their assigned treatment time. After their time was up, they were placed in a bag and hung over the side of the boat until all treatment times were done (~2 hours).

**Release Stage**

We pulled all the bags out of the water and distributed the prawns randomly among six traps with the ends tied shut. These traps were set for ~24 hours.

**Data collection**

After we hauled the traps, we assessed the state of the prawns. They were assigned as alive (0 if dead, 1 if alive), dead (0 if alive, 1 if dead and intact), or scavenged (0 if alive, 1 if dead and scavenged). Stage data (0=juvenile, 1=male, 2=transitional, 3=female, 4=egged female, 5=spent female) and carapace length (if intact) was collected for all prawns. Their band colour (and therefore treatment) was also recorded, or NA (unbanded).

Some alive prawns were assessed for 10 reflexes (0 if absent, 1 if present).

Analysis Plan and Issues

Binomial (logistic) regression with random intercept effects. We plan to have one random effect for trial x trap. There were 21 trials each with 6 traps, so there are 126 levels of the random effect.

**Lost Prawns**

We lost prawns during the treatment stage (mesh bags hung over the side) and the ‘release’ stage (traps). There appears to be more prawns missing from the longer treatments. However, we can only count the number of banded prawns before and after to get treatment loss. Therefore ‘lost’ prawns could have been truly lost or have lost their band. We can also measure truly lost prawns from a trap.

Should we do a formal analysis of whether is a relationship between loss and treatment?

Should we have a threshold for loss above which we don’t use a trial?

What should we call the total for estimating the proportion that survived? The total in each treatment before the ‘release’ stage? The total banded prawns after the traps were pulled up?

**Unbanded**

Some prawns lost their bands during treatment. We can’t know what treatment they were from. We are planning on excluding them.

How will this impact survival estimates?

Can we assume that loss was random across treatments?

Should we perform a formal analysis on Unbanded vs Treatment?

**Scavenged**

The length and stage of some prawns could not be assessed because they were scavenged.

Can we still include these as covariates?

We think there is likely a bias in which prawns were scavenged. Longer treatments-> more dead prawns-> more scavenged prawns -> fewer with length data.

Could we analyze the size and stage distributions of alive vs dead prawns to see if they are different?

Could we Impute stage data where length data are present?

**Model Fitting**

How should we fit our model? MCMC? TMB?

**Model selection**

Global model and Just look at effect size?

**Model Validation**

Withhold some for model validation?