Modelling methods first draft

23 trials were conducted at different locations around the Broughton Archipelago. Two trials (11 and 12) were removed because a freshet resulted in many dead prawns.

We used logistic regression with a random effect for trap (123 levels) to model the data. We fit all combinations of main effects and interactions for our covariates: treatment, air temperature, and carapace length (Table 1). Prawns that lost their band and could not be assigned to a treatment and prawns without length data were not included. Model fitting was done with the lme4 and glmmTMB r packages (laplace approximation).

We expected the trap that a prawn was in for the release stage to effect the probability of survival. The location of the trap, orientation of a given trap on the ground, the presence of predators (sea bugs) and environmental conditions varied between traps, and probably effected survival. We expected variation in survival between traps that we wanted to account for but not capture in the model. The inclusion of the trap random effect accounts for this variation by assuming that for a given value of the linear predictor, the log odds of survival is normally distributed across traps.

Ideas:

Explain variables?

Decisions made

Chronological

Got data

Combined

Map sites

Lost

Unbanded

Stage distributions

REFLEX???

Modelling methods

Explain lost/unbanded

Unbanded

Figure: Unbanded per trial (proportion?)

How they were handled (discarded)

Lost

Figure: Lost per trial (proportion?, per trial/treatment?)

How they were handled (discarded)

Model

Explain model

Explain Random Effect for trap

Results

Table: BIC table

Logistic curve with Confidence Intervals (three temperatures)

RE curves (?)

(reflexes?)

Discussion

Unbanded and Lost

Table: Lost example Table

(reflexes?)

We banded the prawns in each treatment with a certain colour rostrum band before the experimental stage of each trial. Afterward the treatment a prawn underwent was identified by the colour of the rostrum band.

Prawns were therefore lost from treatments in two ways: they lost their band (unbanded) or were no longer in the trap (truly lost). If either of these methods of loss was biased based on a covariate such as survival (and therefore treatment, temperature, etc.) there would be an effect on the observed proportion that survived, and therefore on the effect size of the covariate.

As expected, the proportion of prawns that became unbanded appeared to be random across treatments.

The number lost from each treatment seemed somewhat biased toward longer treatments (and higher temperatures).

While we expect this effect is present, we believe it has a minor effect on results. Table 1 compares the true vs. observed proportion that survived for a hypothetical trap, under different biases in which prawns were lost.

We expected the trap that a prawn was in for the release stage to have a an effect on the probability of survival. The orientation of a given trap on the ground, the presence of predators (sea bugs) and varying environmental conditions varied between traps, and would have effected survival. For this reason, we included trap as a random effect.

Logistic Regression with a random effect of trial x trap

Why this?

Explain trial and trap and what it captures

Interpretation does it change anything

Why not more?