ANOVA tables for Ross et al. 2024

Table 2. Type II ANOVA table of GLMMs for abundance of gastropods per habitat (salt marsh) or vegetation (mangrove forest) and transect. Interactions, while not significant, are retained in the model as they did not affect overall results when removed. Refer to Table 1 caption for an explanation of the different tidal elevations and zone classifications used.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Salt marsh | | |  | Mangrove forests | | |
| Source of variation | *df* | *χ2* | *p* |  | *df* | *χ2* | *p* |
| Habitat or Vegetation | 4 | 410.319 | **< 0.001** |  | 2 | 194.8119 | **< 0.001** |
| Transect | 2 | 6.026 | **0.049** |  | 2 | 7.4240 | **0.024** |
| Habitat or Vegetation × Transect | 8 | 5.358 | 0.719 |  | 4 | 5.5144 | 0.238 |
| *Dispersion parameter for negative binomial family: 1.44 (salt marsh), 0.306 (mangrove forests). P-values less than 0.05 are in* ***bold****.* | | | | | | | |

Table 3. Type II ANOVA table of GLMMs for biomass of vegetation (in salt marsh) or algae (in mangrove forest) and transect. Interactions, while not significant, are retained in the model as they did not affect overall results when removed. Refer to Table 1 caption for an explanation of the different tidal elevations and zone classifications used.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Salt marsh | | |  | Mangrove forests | | |
| Source of variation | *df* | *χ2* | *p* |  | *df* | *χ2* | *p* |
| Habitat or Vegetation | 4 | 2848.97 | **< 0.001** |  | 2 | 66.652 | **< 0.001** |
| Transect | 2 | 3.694 | 0.157 |  | 2 | 0.215 | 0.898 |
| Habitat or Vegetation × Transect | 8 | 3.062 | 0.930 |  | 4 | 3.316 | 0.507 |
| *Dispersion parameter for negative binomial family: 5.78 (salt marsh), 0.528 (mangrove forests). P-values less than 0.05 are in* ***bold****.* | | | | | | | |

Methods text:

We used the lme4 package (Lenth, 2018) to fit generalised linear mixed models (GLMMs) using negative binomial distributions to examine the effects of habitat type/vegetation, transect location, and their interaction on gastropod abundance and total biomass of vegetation. Location was included as a random effect to account for spatial variation. All models were summarised as ANOVA tables using the `car` package (Fox, 2019). Initially, Type III tests were conducted to evaluate the significance of interactions. Since no significant interactions were found, the models were re-analysed using Type II tests to evaluate the main effects without violating marginality (Fox, 2019). Post-hoc pairwise comparisons were performed using the `emmeans` package using Tukey-adjusted comparisons of estimated marginal means (least square means) to identify significant differences between habitat-transect combinations. The results were presented with 95% asymptotic confidence limits (ACLs) and back-transformed to the response scale for easier interpretation.