Investigating fiddler crabs

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Introduction

This is about Atlantic marsh fiddler crab (*Minuca pugnax*) study based in the Plum Island Ecosystem LTER network (Johnson et al. 2019). They're super cool and we wanted to investigate Bergmann's rule on this study system.

Methods

Johnson et al. (2019) collected approximately 30 male crabs each at 13 different salt marshes along the United States Atlantic coast in summer 2016. The carapace of each crab was measured as an indicator of their body size. The researchers also collected data on air temperature, surface water temperature, and the latitude of each collection.

Field sites

The field site was in the Atlantic coast of the United States (Johnson et al. 2019).

Data analysis

We used R Core Team (2025)'s RStudio and the multiple $ packages for data analysis (Wickham et al. 2019, Firke 2024, Ushey and Wickham 2025). We used data from the lterdatasampler package on R (Horst and Brun 2023). Specifically, we used the 'pie_crab' dataset and exported that as a .csv file.

We investigated differences in size across latitude using a linear model.

Results

Table 1: Summary of linear regression on the effect of latitude on fiddler crab body size in the Atlantic coast of the United States in 2016.

Predictor	B	SE	t	p
(Intercept)	-3.62	1.274	-2.84	0.005
latitude	0.49	0.034	14.44	0.000

Overall, we found that as latitude increases, the size of the Altantic fiddler crabs also significantly increases (Linear regression; $\beta \pm \text{SE} = 0.48512 \pm 0.03359$; $p < 0.0001$; **Fig. 1**; **Table 1**).

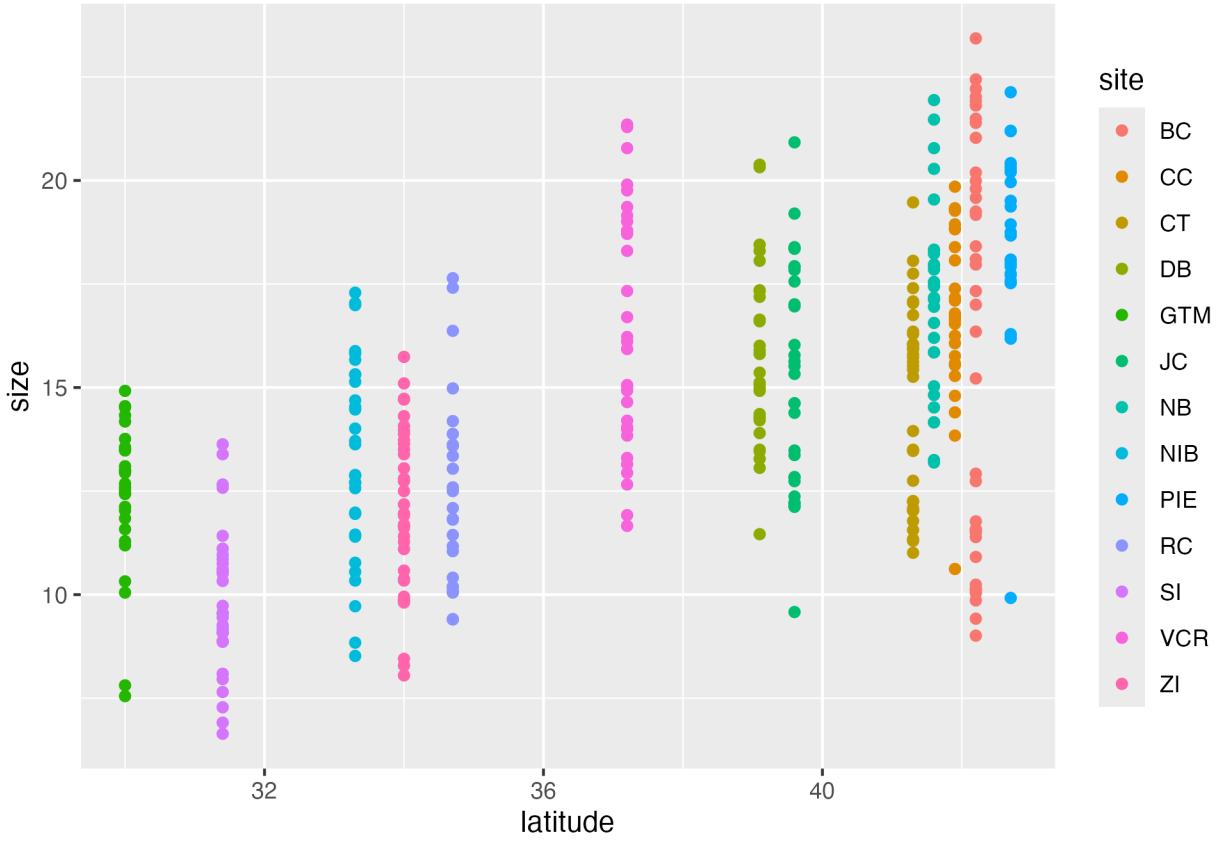

Figure 1: Changes in fiddler crab body size across latitude in the Atlantic Coast of the United States from summer 2016. Each color represents a specific salt marsh where the crabs were sampled.

Discussion

Our study aimed to examine the effect of latitude on the body size of Atlantic fiddler crabs. Importantly, we found that size increases as latitude increases. This supports Bergmann's rule.

References

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