The Chihuahuan Desert Ecosystem

Background

Desert ecosystems have long served as model systems in the study of ecological concepts (e.g., competition, resource pulses, top-down/bottom-up dynamics). Study of a Chihuahuan desert ecosystem near Portal, Arizona, began in 1977 and has monitored the composition and abundances of ants, plant, rodents and precipitation. Individual-level data on rodents (i.e. species, sex, size) has been collected monthly since 1977. The long-term data has been used to address a variety of questions including (1) the effects of competition from kangaroo rats on other granivorous rodents, (2) response of rodents to climatic variability, and (3) the long-term stability and dynamics of a desert rodent community. Precipitation was recorded at the study site from 1980-2002.

Data Structure Descriptions

Variable Name	Variable Definition	Units
tag	Individuals primary identification tag	N/A
mo	Month survey occurred	1= January to 12= December
yr	Year survey occurred	N/A
genus	Genus	AX=*Ammospermophilus spp*; BX=*Baiomys spp*; DX=Dipodomys spp; NX=*Neotoma spp*; OX=*Onychomys spp*; CX=*Chaetodipus spp*; PX=*Peromyscus spp*; RX=*Reithrodontomys spp*; SX=*Sigmodon spp*; SPX=*Spermophilus spp*.
sex	Sex of individual	M= Male; F=Female
hfl	Hindfootlength	Millimetres (mm)
precipitation	Precipitation amount in rain gauge	Millimetres (mm)

Task

Given the background of the dataset and data structure. Formulate and test some interesting research aims, questions and hypotheses. If you want to explore the data and literature, here is a starting paper:

- Morgan Ernest, S, K., *et al*. 2016. Long-term monitoring and experimental manipulation of a Chihuahuan desert ecosystem near Portal, Arizona (1977-2013). *Ecology, 97(4)*. DOI: https://doi.org/10.1890/15-2115.1

If you're short of inspiration, here are a few prompts:
- Does precipitation affect the hindfoot length of rodents?
- Are there sex differences in the hindfoot length of rodents?
- Is richness of rodents affected by precipitation?

[Hints: Do you need to consider random effects? Have you checked you've met the assumptions of the analysis?]