**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 rates 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?]

year as numerical value allows change over time

for every 1 year test

count based on month

discreet data

convert from values between 0 and 1 to a continuous scale by log transforming