Lab 6

**Rank Abundance and Rarefaction.**

1] Rank Abundance.

As we have seen the concept of ‘alpha diversity’ incorporates both the species richness and relative abundance of the community members. Many communities are known to exhibit a log-normal distribution of abundance classes:

In small sample sizes, the rarest species will not be represented so the left side of the distribution is absent; it is said to be “veiled”. However, given the mathematical form of the log-normal curve, we can calculate total predicted species richness if we know both the modal class and the standard deviation of the distribution.

Using the insect data from our Bernard Field Station collection, complete the following abundance-class table:
Identify the modal class. Assume the distribution is symmetrical about this mode, and compute the standard deviation of the distribution.

The predicted total number of species is given by:

\[ N = n_0 \sqrt{2\pi S} \]

where \( n_0 \) is the number of species in the modal class and \( S \) is the standard deviation.

What is the predicted number of species for the Bernard Field Station collection? How does it compare with your previous estimate based on cumulative sample sizes?

2] Rarefaction.

As we saw in last week’s lab, the species richness of a community will increase asymptotically with sample size. Hence, we cannot directly compared species richness of two communities if their sample sizes are radically different.

However, we can correct for sample size differences using rarefaction. Rarefaction predicts how the number of species will fall as individuals are randomly removed from the sample. The calculations are tedious and best done by computer. We will use an online rarefaction calculator, available at: [http://www2.biology.ualberta.ca/jbrzusto/rarefact.php](http://www2.biology.ualberta.ca/jbrzusto/rarefact.php)
Specific instructions are on the webpage. You will need a Java-enabled computer to be able to view and use the applet.

For the Bernard Field Station arthropods, calculate the expected species richness for sample sizes increments of 50, 100, 250, 500, 750 and 100 individuals and plot a graph of total species versus sample size.

3] Think about, and then write up a summary of how you would design a field study with the goal of determining the true number of night-flying moths that inhabit the Bernard Field Station.

References


