Estimating Population Cover Through Mark and Recapture

Overview

In the mark and recapture method, a sample of individuals is captured, tagged,and then released back into the environment. After sufficient time has passed to allow the animals to redistribute, scientists capture another random sample. Some of the captured sample may be marked individuals, and some (or all) will not. Knowing the percentage of marked individuals and the original number marked, one can calculate the approximate size of the population.

With this activity, you can simulate a method for estimating the population size of a species in an area using the mark and recapture method. The beads represent the population of a species found in a research area. **The white beads represent the untagged population, and the red beads represent the tagged population.**

Materials

- Large Deli Cup with White Beads
- Small Plastic Cup with Red Beads
- 1 Extra Small Plastic Cup
- Calculator or Phone

Procedure

1. First, “capture” a portion of the untagged population by removing a handful of white beads from the large deli cup. This deli cup of white beads represents your original population.
2. Now “tag” the captured population in your hand. Instead of marking the beads, you will replace the captured population (the removed white beads) with red beads.
    a. Count the number of white beads captured and record this as the Initial No. of Marked Beads on your Mark and Recapture Data Sheet.
    b. Place these “captured” beads into the small empty deli cup and set aside, as they are no longer needed.
    c. Replace these “captured” beads with the same number of red beads. Place them back into the deli cup you “captured” (from your original population). The red beads represent tagged individuals from the original population being returned to their environment. **You will only “tag” or replace the white beads with red beads once.**
    d. Set the deli cup of red beads aside as they are no longer needed.
3. Mix the tagged beads into the original population. This simulates redistribution of the marked individuals into the original population.
4. Randomly capture (i.e., remove) another handful of beads. Record the total number of beads captured, and also the number of marked beads captured. It is okay if you do not remove any marked beads; record a zero for the number of marked beads per sample if this occurs. Calculate the percent of marked beads captured in the sample. Record the results on your Mark and Recapture Data Sheet.
5. Return these beads to the deli cup (the original population).
6. Repeat steps 4 and 5 until you have captured 20 samples. Determine the average percentage marked for all 20 samples.
7. Use the equation on page 2 (see “Prediction of population size”) to estimate the population size.
8. After you have completed the calculation, count the total number of beads in the deli cup and see how close your prediction was to the actual population size.

Prediction of population size

Use the equation below to estimate the population size+.

Estimate population size = [(initial # of marked beads)(average # of beads captured)]/(average # of recaptured marked beads)*

Mark and Recapture Data Sheet

Sample No.	No. of Marked Beads per Sample	Total Bead Sample Captured	% Marked Beads Captured	Initial No. of Marked Beads*
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
Average	#	+		