Exploring Bird-Cactus Phenology-Dependent Positive Interaction Exchanges

Cactus Site Bird Population Survey Protocol

Joy sampling is a term rooted in the idea that sampling can be joyful and provide quantitative data at the same time. This survey is a systematic version of birding but provides site wide data for bird populations at a cactus dominated site. For this project, we are interested in recording bird visitation, location, density, and behavior. We will employ randomized **line transect** sampling as a survey method.

Equipment:

1. 150-600mm lens with digital camera or binoculars
2. GPS unit (recreational or research grade is acceptable)
3. Data sheets
4. Transect tape (100 meters)
5. Tape measurer (for Point Count sampling)
6. Range finder
7. Compass

Protocol:

Line transect surveys employ systematic protocol to document birds throughout the entire study site. Sampling events should be evenly split between mornings, middays, afternoons, and evenings, as bird activity will likely be higher in mornings and evenings (and we want an equal distribution of the data). Ideally, each sample would be a separate day. We would like to have 50 hours sampling data by the end of each season (flowering and fruiting).

1. Create a 500 x 500 meter grid within study site.
    a. 10 x 10 meter quadrants, with the origin square being 1-1 and increasing along x-axis and y-axis
    b. Example of a smaller grid (ours will continue to 50 along x and y axes):

5-1	5-2	5-3	5-4	5-5
4-1	4-2	4-3	4-4	4-5
3-1	3-2	3-3	3-4	3-5
2-1	2-2	2-3	2-4	2-5
1-1	1-2	1-3	1-4	1-5

Observer

    c. Use a random number generator selected from 1 to 50 to determine two numbers. The first number will be your x-axis value, and the second your y. For example, if your RNG proposed 15 and 48, you would move 15 quadrants to the left from your origin (150 meters) and 48 quadrants up (480 meters) to begin the line transect.

2. Record coordinates of center of quadrant, this is the transect start point.
3. Using a random number generator selecting from 1-4 to determine direction to walk in of cardinal direction selected by RNG.
    a. 1 = North, 2 = East, 3 = South, 4 = West
4. Walk slowly along 100m transect line (using transect tape), looking for all birds.
    a. If you see multiple birds that are not within one flock, record the closer bird first.
    b. If you see a flock, choose one bird as "focal" individual. Note number of birds in flock. Follow protocol for all birds in the flock.
5. Using range finder, note distance to bird from transect.
    a. The distance should be measured with a 90 degree angle from transect line and line to bird.
6. Photograph bird (try to get >5 pictures, or <30 second video) if camera is available
    a. Always start session with blank SD card, labelled with site 3-letter acronym, date, and sampling style abbreviation.
    b. Record Photo ID range of each bird sighting on datasheet.
    c. Take photos when you first see it, then move closer to take more detailed photos.
    d. After session, load photos into unique file named the same as step 3a.
    e. Choose one photo from each sighting that best represents bird species and behavior.
    f. Rename chosen sighting photo to be the same as the Bird ID for that record. That is, there should be one photo for each record. See step 10 for file name protocol.
7. Use the Bird Ethogram to record bird behavior codes and take notes of any unusual details. Record the "highest order" behavior if the bird is performing more than one behavior at once.
8. ID bird to most precise taxonomic level (ideally, species).
9. Get as close as you can to where the bird was first spotted and take lat/lon of bird location
    a. Do not disturb bird! Either wait for it to leave or take lat/lon from further away and make a note.
10. Name point in GPS as three-letter code for site followed by bird number ID for that day. Ex: The 4th bird documented at Granites Sunset Cove would be coded as GSC4, or the 18th bird at Wind Wolves Historical Bakersfield cactus population would WWH18.
11. Repeat protocol for 2 hours sessions. Note end time and end latitude/longitude.

Tips

1. To locate bird, use your ears as well!
2. Do not record flyover observations.
    a. A flyover is when a bird flies over a site without us seeing it take off or land from any point. Think of when Canada Geese fly overhead.
3. Bring spare double A batteries for GPS with you! Charge camera battery every night.
4. Bring many spare SD cards into the field with you (~10)
5. Do not delete any photos in the field, even if they seem to be blurry/not of the bird. Only do this on the computer. If you run out of space, use another SD card and put photos in separate file.