**An Introduction to Observational Studies using Bird Feeder Webcams**

*Lab 1*

*Bird Feeder Webcam Data Collection*

 In this lab exercise, you will collect data that will be compiled together as a class. Specifically, you will make live observations of bird visits to feeding stations using a set of webcams located throughout the Western hemisphere.

**Learning Objectives**

➢ Learn about data collection and standardized recording of data.

➢ Use observations you make to begin thinking about hypotheses.

➢ Evaluate geographical patterns in biodiversity and their potential causes.

➢ Collect your own data that will be used in R during Lab 2.

**Background**

 Biologists have long been fascinated and puzzled by the observation that many groups of organisms are more diverse in the tropics than in temperate or arctic regions (Pianka 1966; Hillebrand 2004; Mittelbach et al. 2007). However, this pattern does not hold for all groups; for example, mosses and detritivorous aquatic insects are less diverse in the tropics (Boyero et al. 2011; Mateo et al. 2016). Does this pattern hold for birds visiting feeding stations? We will test the hypothesis that bird diversity is higher in the tropics because of increased evapotranspiration, which in turn increases plant productivity (Hawkins et al. 2003). One prediction of this hypothesis is that frugivorous birds (those that consume fruit) should be particularly more diverse in the tropics, because these birds rely entirely on plant production for survival (Kissling et al. 2009; Kissling et al. 2012).

 Feeding stations are fixed locations where humans leave various types of food out to attract wildlife, and are particularly commonly used to attract birds (Cowie & Hinsley 1988). Although this practice can lead to increased disease prevalence (Galbraith et al. 2017) and even rapid evolution of bird traits (De León et al. 2011; Bosse et al. 2017), it is nonetheless widely used by people ranging from gardeners looking to bring some life to their backyard to ecolodges trying to attract tourism dollars from wealthy birdwatchers (Cowie & Hinsley 1988; Ocampo-Peñuela & Winton 2017). Due to recent improvements in technology, a growing number of these feeding stations now have live webcams that allow us to make observations about bird diversity from locations ranging from the Andes to Northern Ontario. We will specifically examine webcams from five feeding stations across a latitudinal gradient

1. El Valle de Antón, Coclé, Panamá (8.62 ºN, 725 m)

 https://www.allaboutbirds.org/cams/panama-fruit-feeders

1. Antonina, Paraná, Brazil (25.43 ºS, 25 m)

 https://www.ornithos.com.br/live-cam-1

1. Fort Davis, Texas, USA (30.59 ºN, 1500 m)

 https://www.allaboutbirds.org/cams/west-texas-hummingbirds

1. Ithaca, New York, USA (42.44 ºN, 325 m)

 https://www.allaboutbirds.org/cams/cornell-lab-feederwatch

1. Manitouwadge, Ontario, Canada (49.12 ºN, 325 m)

 https://www.allaboutbirds.org/cams/ontario-feederwatch

**Protocol**

*Preparing for Data Collection*

1. Sign up for three of the 10-minute timeslots distributed across the different webcam sites using the sheet provided.
* You may be tempted to sign up for all of the tropical sites, but please select a mix of sites so that everyone can see a diversity of different birds
* All cameras record the previous 12 hours, you can therefore watch video from various time points within the span of the class period
1. Familiarize yourself with the Bird ID Guide
* The Bird ID Guide covers the most common species observed from each site. For each species you are given the common and scientific names, a reference photo, a short description to aid in identification, and a four-letter “alpha code”. We will use the alpha codes of each species in our statistical analysis. (Note: The four-letter alpha codes are only established for birds in North and Central America, so we have made up codes for South American Species)
* This is not an ornithological (the study of birds) focused class, so do not feel pressured to identify the birds on the spot. All live streams can be paused to count the number of individuals or study their features to complete the ID
* It may be difficult to record the number of individuals of a species if they visit in large flocks. Given the limitations of a live stream, and estimation will suffice.
* If there are any birds that you cannot identify, or are not listed within the Bird ID Guide, you should record them with the alpha code “UNKN” and, if possible, take a screenshot so that we may attempt to identify this mystery bird later.

*Collecting Your Data*

1. Record all birds observed
* Best practice for use of any dataset is to keep and individual record of observations in addition to adding them to the public dataset.
* Record the species’ alpha code, the number of individuals, and any other interesting observations you make
1. Record abiotic conditions
* Current temperature
* Absence or presence of precipitation
* Any other interesting or unusual things that may have occurred during your observation. (ex. A huge gust of wind knocked over one of the feeders)
1. Record type of food used at feeding station
* Seed/Grain – mixes of seeds like sunflower seeds or small black Nyjer seeds that are used to fill feeders or left on a platform, larger nuts, or rice.
* Fruit – typically consists of whole pieces of fruit like bananas, plantains, or citrus fruits
* Sugar/Nectar – Liquid filled into a container which birds can drink
* Suet – A fat product that normally looks like a tannish rectangle filled with seeds, fruits, or other foods and presented in a large cage-like feeder
1. Record guest appearances
* You may notice other non-avian animals (maybe even a researcher coming to replenish food stock) visiting the feeds. If so, record those appearances in the observations!

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