American robin (*Turdus migratorius*)

# Diet Comparisons of North American Passerines

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## Introduction

**Study 1: Energy** is often defined as the ability to do work (McDonald 1981). Energy from food is not only required for physical activity, but also in processes such as **growth** and **reproduction** (Bondi 1987, Maynard et al. 1979).

The main diet of American robins includes terrestrial invertebrates and fruits (Vanderhoff et al. 2016). Differing life history goals for **male and female** American robins may require **different amounts of energy** from food.

**Hypothesis**: Either sex of American robin may require different amounts of nutrition for life history events such as egg creation or producing brighter feathers.

**Prediction**: If worms are of **higher nutritional importance** to one sex of American robins, then when surveyed the sex requiring more energy will have **higher consumption rates** of worms than the other.

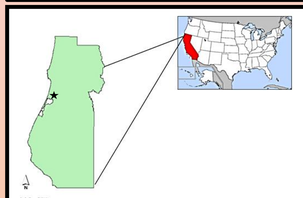
**Study 2:** What percentage of families of Order Passeriformes in North America **seasonally change their diets** from their **primary diet** to a diet that **includes or emphasizes fruit**?

What **seasons** or **life stages** are fruit the **most important** in.

**Hypothesis:** During **taxing periods** such as breeding and winter, **fruits will be emphasized or included** in diets of birds that have seasonal variations.

**Prediction:** If fruits are **more important during taxing life periods** such as breeding and winter, we will see a **higher proportion of passerines including fruit at those times.**

## Study Area



**I conducted my study in Arcata, CA, USA (40.8665° N, 124.0828° W).**

Vegetation surveyed included **grass lawns** (*Poaceae*) in residential areas and on the campus of Humboldt State University.

## Methods

**Study 1:**

**Conducted** at sunrise through the afternoon as robins are most actively foraging during those periods.

**Located** a group of robins and **sat 5-10m away** from the group of robins and remained in that area for 5 minutes allowing them to get acclimated.

Used binoculars to **locate a male or female robin**. I then started a timer for **3 minutes** after the individual made its first strike at the ground.

I then observed the **opposite sex** to compare them.

**Study 2:**

I utilized the Cornell Lab of Ornithology Birds of North America Database

Went through diet and foraging information for the entire order of Passeriformes to assess which passerines include or emphasize fruit at

Searched for key words migration, wintering, breeding or non-breeding and what season of the year the diet switch occurred.

## Results

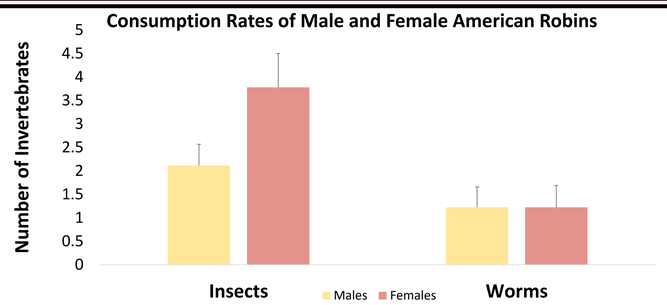
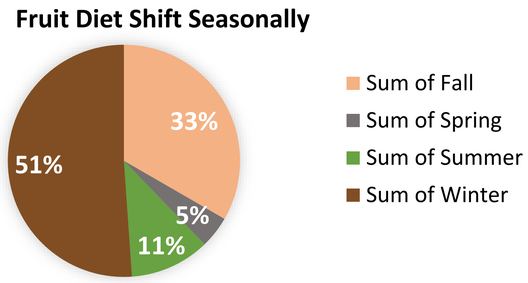



Figure 1. Number of insects eaten by male (yellow) and female (pink) American robins.

**Statistical test:** I ran a two tailed t-test to test for significance between diet differences in male and female American robins**.** No significance in difference between diets of males and females was detected for insects **(*t* = 1.95, df = 16, *P* = 0.06)** or worms **(*t* = 0, df = 16, *P* = 1)**.



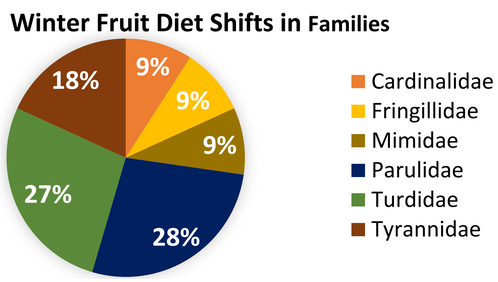




Figure 2, 3. Winter was the largest percentage of seasonal diet changes to including or emphasizing more fruit. In winter months, the family who had the most members

| Family | Total switch | Some fruit | Much fruit |
|---|---|---|---|
| Cardinalidae | 1 | 3 | |
| Fringillidae | 2 | 1 | 3 |
| Icteridae | | 1 | |
| Icteriidae | | | 1 |
| Mimidae | 1 | 2 | 2 |
| Paridae | | | 1 |
| Parulidae | 1 | 6 | 1 |
| Regulidae | | 1 | |
| Remizidae | | 1 | |
| Sturnidae | | | 1 |
| Troglodytidae | | 1 | |
| Turdidae | | 4 | 2 |
| Tyrannidae | | 7 | 1 |
| Vireonidae | 1 | 7 | |
| Total | 6 | 34 | 12 |

## Discussion

**Study 1:** My results **do not support the hypothesis that one sex of American robin requires more energy** through differing amounts of food consumed.

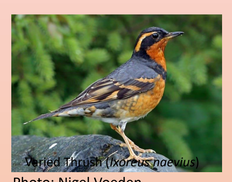
In one study, comprehensive diet analysis of American robin stomachs did not indicate a difference in male and female diets, but they **could not account for amount of earthworms (*Lumbricina*)** even though they are a large prey base (Beal 1915, Wheelwright 1986). It is possible that worms may still be an unaccounted variable that I either did not sample at the right time of year when those nutrients may be more important or also my sample size was not sufficient enough to be able to display any patterns

**Study 2:** My results showed that out of about 350 passerines of North America listed on the Cornell Lab site, 54 species include or emphasize fruit consumption in different parts of the year. Out of fall, spring, summer, and winter, winter contained the largest amount of species utilizing fruit. Within winter, Parulidae and Turdidae have the most amount of species that utilize fruit. Finally, within all the families of Passeriformes, most of them utilized “some fruit” in their diets when they did emphasize fruit in any given time of year.

This study had flaws in that I only utilized one source (Cornell Lab of Ornithology Birds of North America) for diet information as well as the “why” these birds emphasize fruit was not addressed. The “why” in many sources was lacking because more research needed to be done, so that may have not been an easily quantifiable aspect.


American redstart (*Setophaga ruticilla*)
Photo: Bob Gress


cotoneaster
Photo: Van Chaplin, Joseph De Sciose


Veried thrush (*Ixoreus naevius*)
Photo: Nigel Voeden

## Management Implications

Understanding patterns of diet shifts in passerines during different life stages or different times of year may be important for managers who provide migratory or wintering habitats. Understanding the role of fruit importance in energy acquisition during important life stages such as breeding and migration can help even in habitat restoration or city planning if these birds were to be kept in mind.

## Acknowledgements

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