

# Patterns of Birds Visiting a Feeder in an Open Area on the Cedar Crest College Campus in Allentown, PA

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## INTRODUCTION

Throughout various countries, including the United States, the provisioning of food to wild birds through bird feeders is quite common. According to one study, over forty percent of households in the United States have bird feeders set up outside of their homes (Tryjanowski et al. 2015). Regardless of their location, most people are able to observe a wide variety of wild birds at feeders, including the house sparrow (*Passer domesticus*), the blue jay (*Cyanocitta cristata*), and the northern cardinal (*Cardinalis cardinalis*) throughout the seasons. Likewise, by providing a steady source of food, these feeders increase the chances of survival of wild birds, especially during critical and challenging periods, such as the winter, when food is often scarce in most areas (Wilcoxon et al. 2015). However, in addition to bringing different species of birds to the homes of many individuals for their enjoyment and being an additional food source for birds, bird feeders can also serve as a means of conducting valuable research on wild bird species. Researchers have suggested that monitoring bird populations over a number of years can provide some insight into overall environmental health (Gregory and van Strien 2010). We have access to similar data collected in 2016, which we compared with our current study to observe the overall distribution of bird species on campus.



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**Figure 1.** The "quad feeder" on the Cedar Crest College campus. Data was collected from standing in the gazebo. Eight bird species of interest are shown above.

## METHODS

**Study Site:** Cedar Crest College, Allentown, PA 18104. Single feeder hung in the middle of "the quad", a fairly open, grassy area in the middle of campus with several trees and some shrubs throughout.

**Duration of Study:** September 30 – November 29, 2020

**Feeder:** Filled with black sunflower seeds from Wild Birds Unlimited Blend.

Squirrel-proof feeder with access to seed blocked if a heavy animal landed on perch of feeder.

**Observations:** 10 minutes per day during peak sunlight hours.

**Visit:** Birds were considered to be visiting the feeder if they perched on a hook, the feeder itself, or if they were under the feeder within a 1m radius from the base of the feeder.

**Data Analysis:**

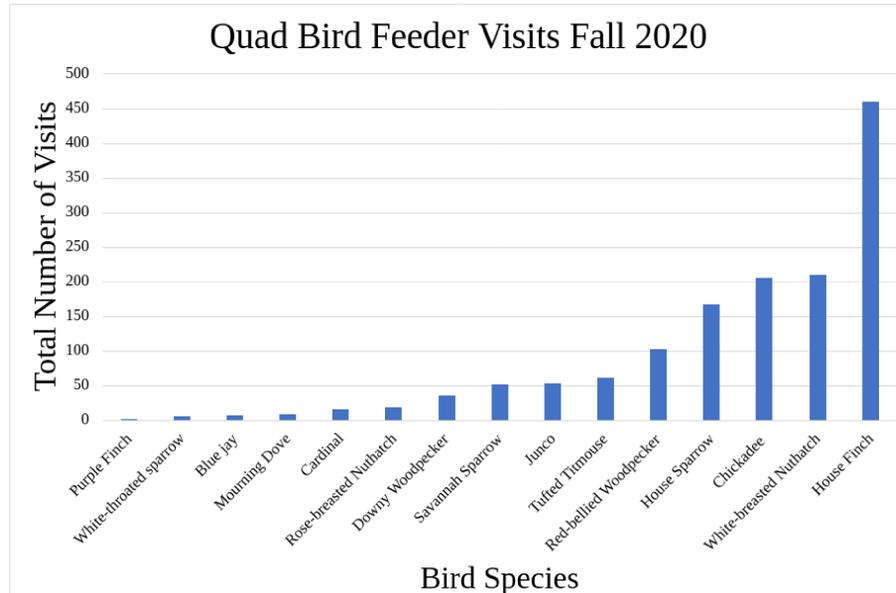
**The total number of visits** made by each bird species to each feeder was recorded over the course of the observation period. In 2020 these observations ran for 9 weeks, in 2012 these observations ran for 12 weeks (see more information below). (Figures 2 and 3)

### Weekly Patterns of Eight Species of Interest:

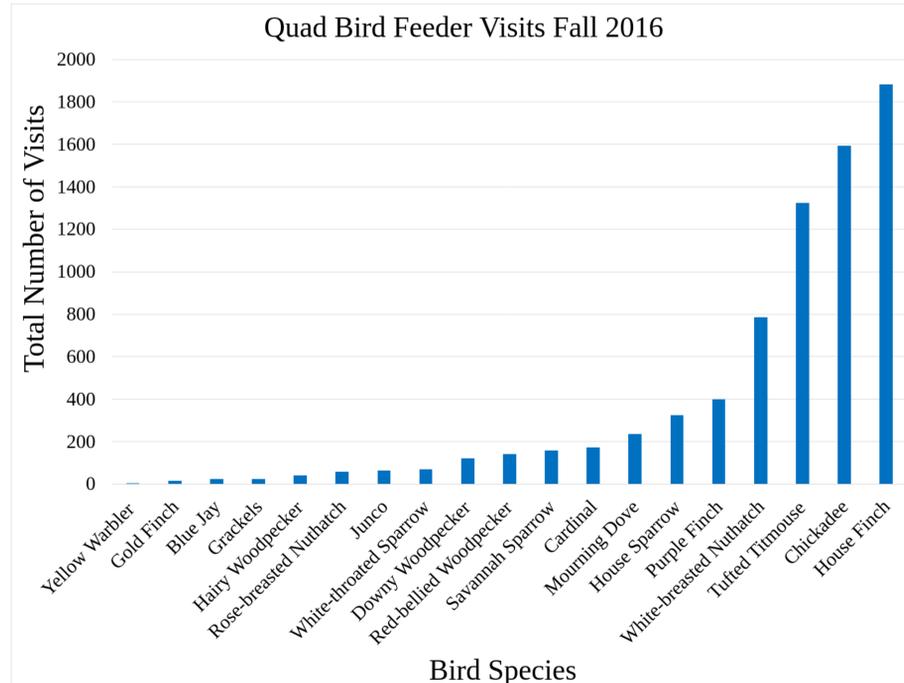
We chose eight species of interest to study more closely. The total number of visits recorded for each of these eight species for a particular week was divided by the total number of visits of all bird species made during that particular week to obtain the percentage of visits made by each of those eight bird species.

These data were compared to data collected in 2016 by Cedar Crest College students Selene L. Presley and Shalen B. Roman. They collected data for 12 weeks at the same location, using the same methods described above. We used their quad data from their weeks 2-10, which corresponded by date to our weeks 1-9, to compare percentages of visits made by the eight species of interest.

## RESULTS



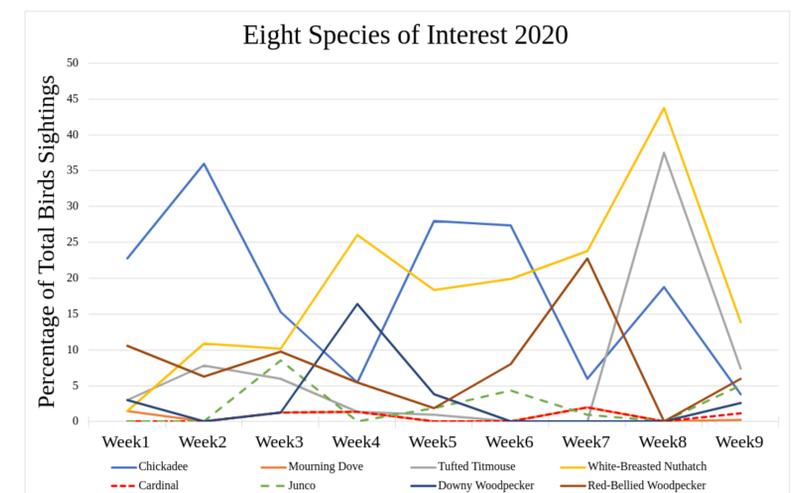
**Figure 2.** The number of bird visits at the quad feeder by species. On this graph there are 15 species charted. There is a dramatic increase between the most common and second most common species, but otherwise the increase is close to constant exponentially.



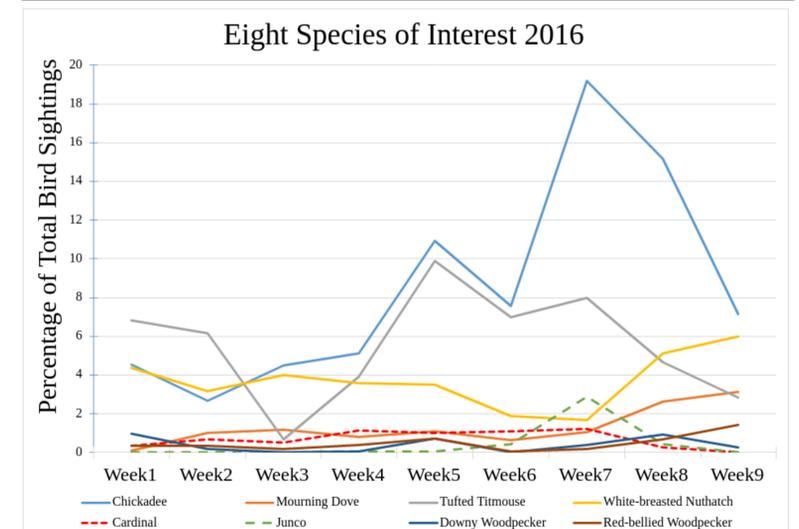
**Figure 3.** The total number of bird visits at the quad feeder by species in 2016. We see a fairly uniform exponential increase from the least common bird to the most common. On this graph there are 19 species charted. We see that between 2016 and 2020, junco visits increased relative to the other species, cardinal visits decreased, mourning dove visits decreased, and tufted titmouse visits decreased. There were fewer observations made per day in 2020 than in 2016, but it is interesting that there were 4 fewer species observed in 2020 than in 2016.

**Table 1.** The total number of bird visits at the quad feeder by per week – the dates were comparable between the two years. Note that data was collected more often in 2016 (3 times a day vs. 1 a day). Thus, it is the trends in the data, not the raw numbers that are most important.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
<b>2020</b>	66	64	235	73	207	161	101	16	418
<b>2016</b>	535	284	108	318	778	563	625	1053	462



**Figure 5.** This is the percentage of the total bird sightings that each species comprised of per week for nine weeks in 2020. Note that the percentage white-breasted nuthatches and tufted titmice peaked near the end of the season, while the percentage of chickadees peaked near the beginning of the season.



**Figure 6.** This is the percentage of the total bird sightings that each species comprised of per week for nine weeks in 2016. Notice that the percentage chickadees peaked near the end of the season while the percentage of tufted titmice peaked near the middle of the season.

## DISCUSSION

We see in both years that more birds peaked later in the season which was in late November. Black capped chickadees have been shown to expend energy to find food in cooler seasons, especially winter (Odum 1942). In 2020 we see that the proportion of chickadee visits was higher in the early and mid-autumn. Note that this was not the case in 2016. Also note that in the Lehigh Valley, there is a mix of black-capped, Carolina, and hybrids of these two species of chickadees (Taylor et al. 2014). It is known that bird populations are a good indicator of the biodiversity of a region (Gregory and Stein, 2010). We see that house finches are the most common bird in both years studied and are even more common compared to the other species in 2020. We also see that there are 4 less species sighted in 2020 than 2016. This may indicate that there has been some loss of biodiversity between 2016 and 2020.

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