

# **Visitation Length and Frequency at a Bird Feeder in Two Different Habitats**

by

Patrick Harmon

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Sponsor: Dr. Allyson Jackson

Second Reader: Dr. Ryan Taylor

## ABSTRACT

Bird behavior at feeders has been documented in many studies but feeder visit length and frequency have not been studied across multiple habitat types. Using GoPro camera footage taken over the course of six randomly selected days in November, I looked at how the length and number of visits differed between species in an open habitat and an edge habitat in the same general area. Reviewing the footage has shown the average visitation length at the edge habitat feeder was greater than the open habitat feeder. The frequency of visits was also greater in edge habitat since it had more visits from each species, the exception was the mourning dove (*Zenaida macroura*) which appeared more often at the open habitat feeder. House finches (*Haemorhous mexicanus*) were the most common visiting species followed by mourning doves. White-throated sparrows (*Zonotrichia albicollis*) were also common visitors but mostly appeared at the edge habitat feeder. This study demonstrates how average feeder visit length and frequency can change between areas relatively close to each other.

## INTRODUCTION

Throughout much of the world, birds have been greatly affected by urbanization and human development. As such urbanization has been cited as one of the greatest threats to biodiversity in the United States (Czech 2005). Some bird species have changed their behavior in urbanized environments, many become bolder than the rural counterparts and are more willing to take risks in acquiring food and mates (Scales et al. 2011). The species composition of bird communities can also be significantly impacted by urbanization (Galbraith et al. 2015). These areas have a greater number of invasive species when compared to more rural environments (Le Louarn et al. 2016). Despite the negative effects urbanization has on birds, there are some positive aspects.

Supplementary feeding has arisen to address the issue of urbanization and is now a widely enjoyed hobby in backyards around the world (Tryjanowski et al. 2015). Feeders can have several ecological benefits for avian communities such as simply being a valuable food resource, especially during the winter (Robb et al. 2008). Feeders have also been shown to increase the fitness of birds. In one study, birds that used feeders over the winter had increased

levels of reproductive fitness during the following breeding season (Robb et al. 2008). Despite this there are problems that come with using bird feeders. Some species may become dependent on feeders and either fail to develop natural foraging behaviors or lose their ability to find food on their own when no feeder is present (Brittingham and Temple 1992). Improper cleaning of feeders can lead to an increased risk of disease transmission which can spread quickly throughout an urban avian community (Giraudeau et al. 2014). Feeders may also harm native bird species by benefitting invasives, allowing them to drive away their native competitors (Le Louarn et al. 2016). What is not well known is how visit frequency and feeder visit length are affected when comparing open and edge habitats.

Edge habitat can be defined as woodlands or forests that border along open areas like fields or farmland (Best et al. 1990). This type of habitat is vital to various species of animals, especially birds as many rely on forest edges for nesting, reproduction, and food. Birds are more likely to be found in higher densities along forest edges than in open habitats like cornfields or grasslands, showing how edge habitat can be crucial for the survival of many different bird species (Best et al. 1990). Edge habitat is especially important for birds found in urbanized areas. Green spaces such as gardens, parks, and fragmented forests provide a supplementary form of edge habitat for birds that they would otherwise use in their natural ecosystems (Cox et al. 2016). These areas assist in the dispersal of birds between forested habitats (Uroy et al. 2019). However, the dispersal ability of many birds is still heavily limited to fragmented habitat zones within urbanized areas (Bélisle and Desrochers 2002). These variables may influence how often and how long birds may visit a feeder near edge habitat.

Open habitats are areas that are relatively scarce in terms of forest cover, instead they are mostly dominated by shrubs and grasses (Costa et al. 2013). Areas such as grasslands and meadows serve as nesting areas for many species of birds however these species face considerable threats such as overgrazing, human disturbance, and increased exposure to predators (Purger et al. 2012). Birds may avoid using feeders in open habitats due to this increased risk of predation (Uroy et al. 2019). Animals such as sharp-shinned hawks (*Accipiter striatus*) and Cooper's hawks (*Accipiter cooperii*) have been observed catching songbirds at

feeders located in open areas (Dunn and Tessaglia 1994). All of these factors could play a role in the length and number of bird visits to a feeder in open habitat.

Very few reports have looked at the relationship between how often species visit feeders, how long they use them, and what habitat they are placed in. For this observational study I looked at how the length of feeder visits and the frequency of visits between species varied within an avian community at an open habitat and an edge habitat. By taking videos of birds visiting feeders at these sites, I was able to analyze and compare how the length and frequency of visits changed between species at the two habitats.

## METHODS

**Study Site** - The climate in New York state is generally considered temperate characterized by cold temperatures and little humidity in the winter months while the summers are usually hot and humid. By late autumn many bird species have migrated south in preparation for the winter and those that stay are storing up their energy for winter. Two bird feeders were installed at the Purchase College pollinator garden. One feeder was installed in an open area approximately 60 feet from a neighboring woodlot, another feeder was installed right at the edge of this woodlot. Only one feeder was used at a time to prevent birds from accessing both food sources.



**Field Methods** - Observations took place every day for 3 weeks in November, alternating a feeder between open and edge habitat every day at sunrise for 40 minutes since this is around when birds begin foraging in the morning (Boas et al. 2001). A GoPro camera was installed at

the two feeder sites to record the number of visiting birds. Each camera was placed on a stand about 4 feet off the ground and 5 feet away from the feeder so they were able to capture an optimal view of the feeder and the surrounding area. The GoPro footage served as the primary species identifier for this study. Manual observations using binoculars were also taken from approximately 50 feet away while the camera recorded visiting birds. This was an optimal distance to observe the birds since they seemed undeterred when in the presence of humans. Birds that live in urban and suburban communities, such as Purchase College, are less likely to view humans as predators because they are habituated to their presence so the need to stay hidden was not necessary (Vincze et al. 2016). The data from the manual observations was considered inconclusive and was not counted towards the visit length or visit frequency analyses. After the observation period concluded, videos from three open habitat sampling days and three edge habitat sampling days were randomly selected from the 3 week observation period for analysis.

Video analysis - To measure average visit length, I marked the specific times that each bird landed at or under the feeder and the times that they flew away for each of the six sampling periods. Then the number of seconds were counted for each bird that used the feeders. For visit frequency, I identified each bird species that appeared and recorded the number of visits for each species. After all birds were marked the results were graphed on Microsoft Excel.

## RESULTS

### Feeder Visit Length

Figure 1 down below shows that the average length of visitation when looking at all birds combined was greatest in the edge habitat with 49.01 seconds and 29.8 seconds in the open habitat. When looking at each separate species in Figure 2, mourning doves were the longest-staying visitors at both feeder sites with an average visit length of 122 seconds at the edge habitat and 95 seconds at the open habitat. White-throated sparrows had the second longest average visit at the edge feeder with a rate of 77.2 seconds but only had an average visit length of 27.9 seconds at the open habitat. Song sparrows (*Melospiza melodia*) had an average visit length

of 54.6 seconds at the edge habitat and 34 seconds at the open habitat. Even though house finches were incredibly abundant they only had an average visit length of 38.07 seconds and 25.5 seconds for the edge and open habitats respectively, house sparrows (*Passer domesticus*) also had relatively short average visits of 22.8 and 15.3 seconds for the edge and open habitats. Only one blue jay (*Cyanocitta cristata*) was observed at the edge habitat with a 5 second visit. Several dark-eyed juncos (*Junco hyemalis*) visited the open feeder with an average visit of 4 seconds. The average visit length for each species in each habitat can be seen in Figure 3. The data presented on Figure 4 shows the average feeder visit length for each species for each day of observation.

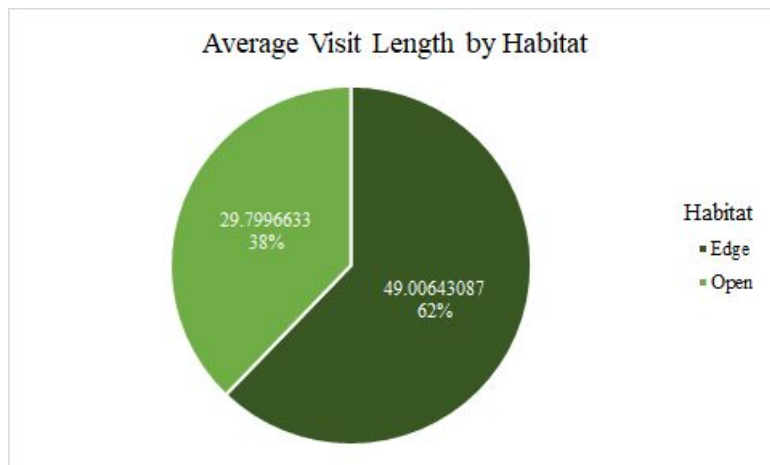


Fig. 1 - Average feeder visit length in each habitat type.

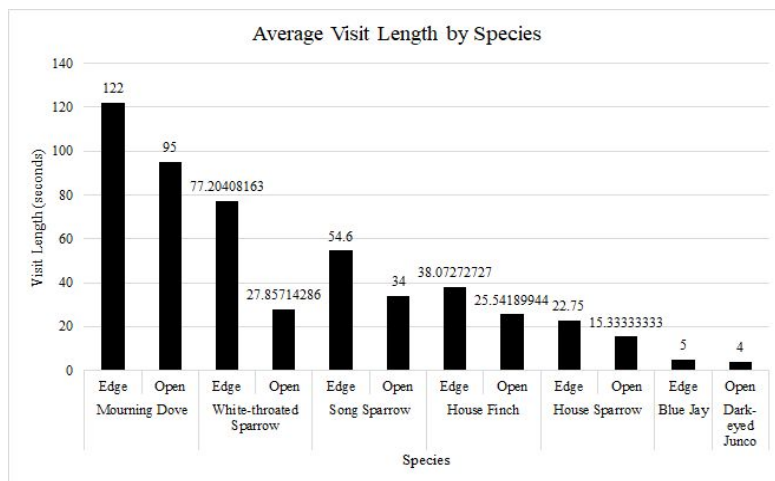


Fig. 2 - Average feeder visit length for each observed species in both habitats.

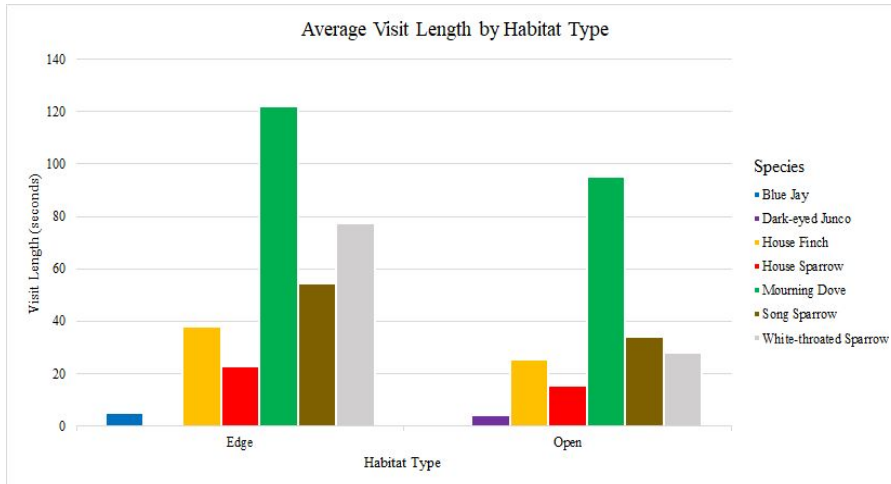


Fig. 3 - Comparison of average feeder visit length by habitat.

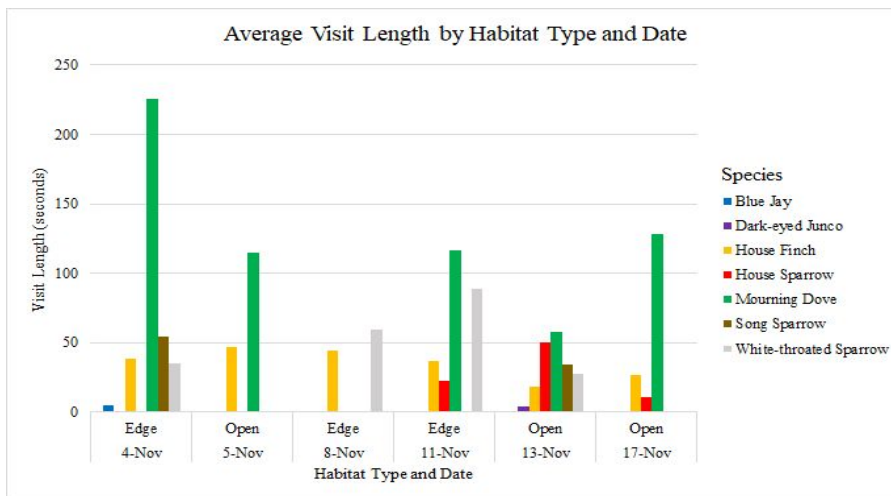


Fig. 4 - Average feeder visit length for each sampling date.

### Feeder Visit Frequency

Overall, the number of species that visited each site was relatively uniform however the visit frequency for each species differed between habitat types. Figure 5 shows the total number of feeder visits was greatest in the open habitat with 594 visits and 311 visits in the edge habitat. Figure 6 shows house finches were the most commonly observed species at both feeder sites with 537 total visits observed at the open habitat and 220 at the edge habitat. Mourning doves were the second most common with 38 visits observed in the open habitat and 20 in the edge

habitat. White-throated sparrows were the third most common species in total number of visits but were mostly seen at the edge site with 49 visits and only 7 in the open site. They were also the most commonly observed species other than house finches at the edge site, overtaking mourning doves which were the next most common visitors at the edge habitat as shown in Figure 7. Other species observed were house sparrows (open: 9, edge: 16) and song sparrows (open: 1, edge: 5). Only 2 dark-eyed juncos were found at the open feeder site and 1 blue jay was seen at the edge feeder site. Figure 8 shows the average number of visits per species for each day of observation.

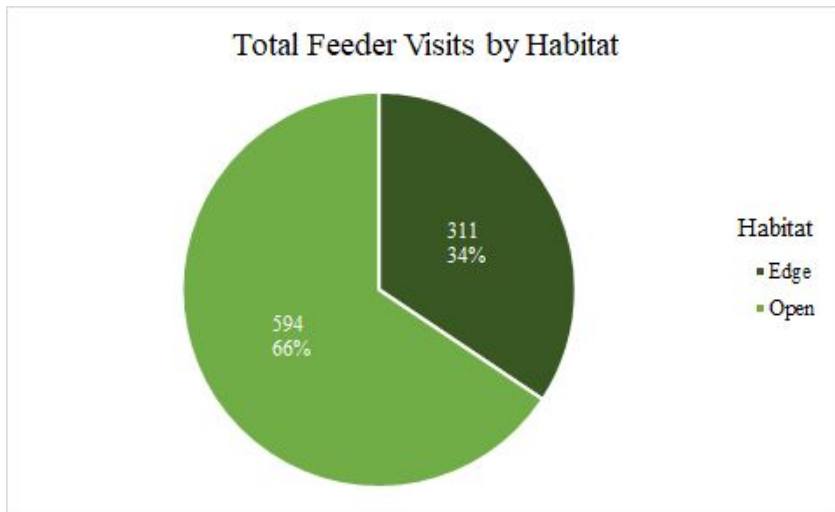


Fig. 5 - Total number of feeder visits in each habitat type.

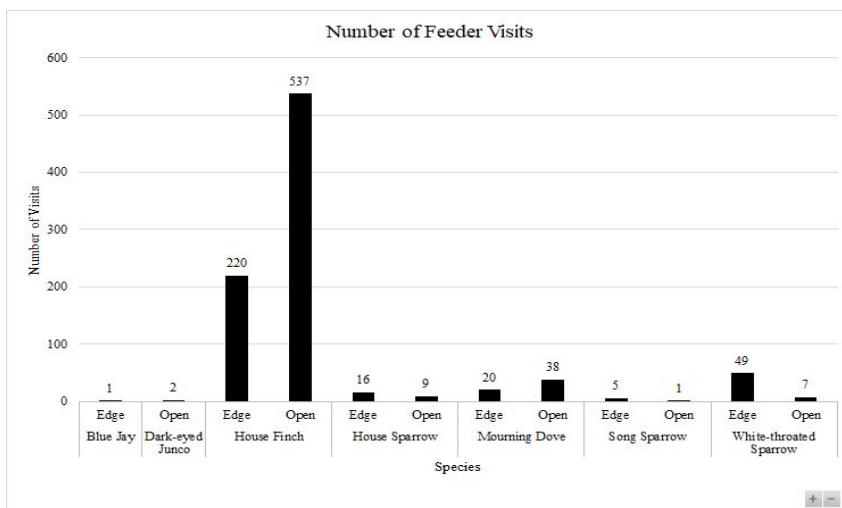


Fig. 6 - Number of feeder visits for each observed species in both habitats.



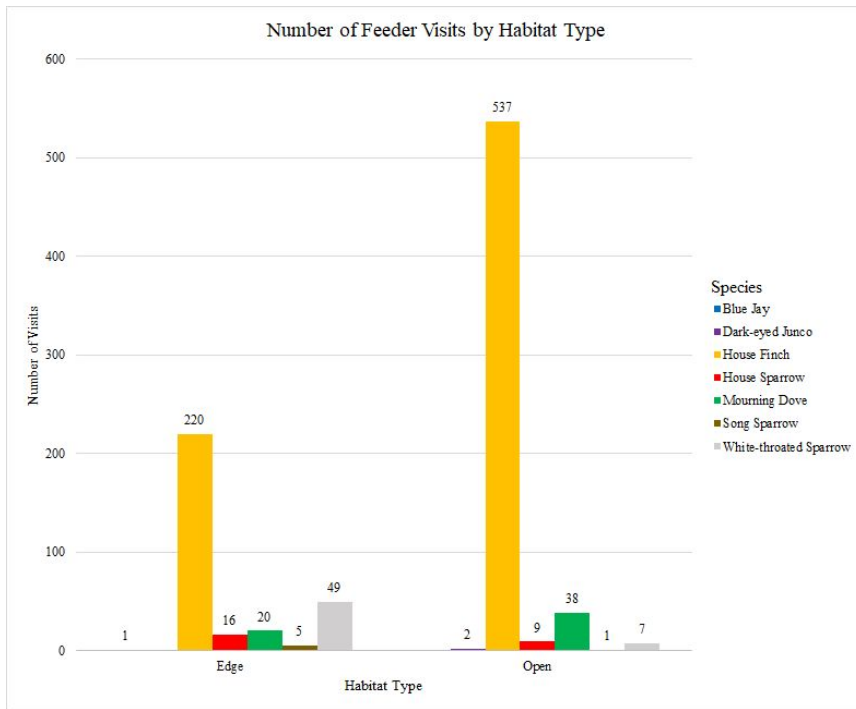


Fig. 7 - Comparison of the number of feeder visits by habitat.

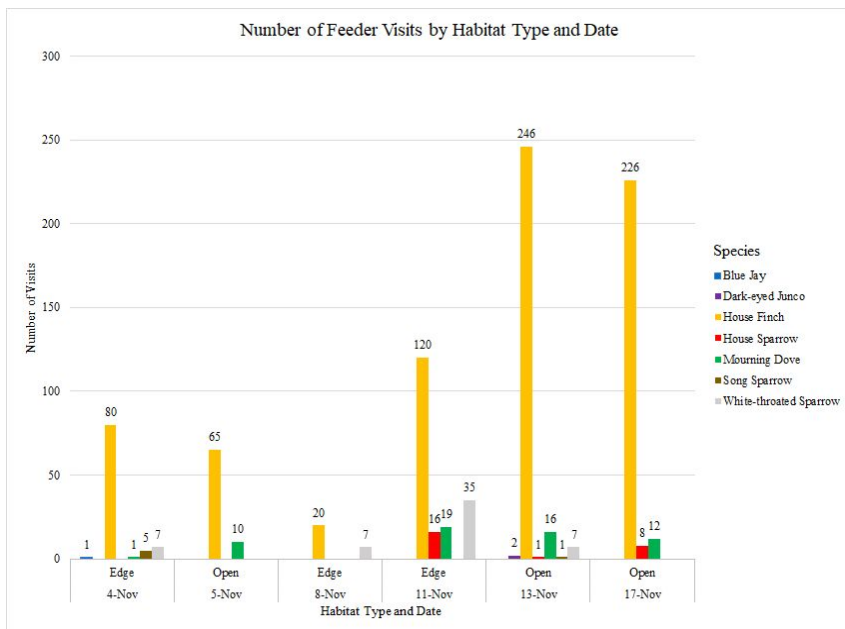


Fig. 8 - Number of feeder visits for each observed species by date.

## DISCUSSION

Despite the two sites being relatively close to each other, the length of visits differed between them. The longer visits to the edge habitat feeder may imply that the birds felt safer in this location when compared to the open habitat feeder. This may be due to the hunting strategies of aerial predators such as sharp-shinned hawks which are more likely to capture their prey in open areas with little forest cover (Dunn and Tessaglia 1994). In the area where the edge feeder was situated there was an abundance of shrubs and trees surrounding the feeder, this cover left little room for predators to ambush songbirds that ate at the feeder. Birds will sometimes take longer routes by using edge habitat or forest cover rather than flying across open areas (Bélisle and Desrochers 2002). The greater number of total visits at the open habitat suggests that some birds may have assessed the risks of acquiring food where little cover was present and made shorter visits to the feeder so that they reduced their time being exposed.

Some species were found more at one site than the other, this may relate to their foraging behaviors and habitat preferences. Edge habitats were typically found to favor avian species rather than inhibit them (Paquet et al. 2006). Songbirds in general also seemed to prefer foraging under cover due to the possible risks of predation (Whiting 2003). White-throated sparrows were mostly found eating on the ground at the edge habitat since they feed primarily on insects and seeds low to the ground near shrubs and bushes (Falls and Kopachena 2020). As such they were mostly eating the seeds that other birds had dropped when they visited the feeders. Dark-eyed juncos are also ground foragers but were only present at the open habitat feeder. This may have been due to their winter foraging behavior, they are more vigilant at sunrise and will readily forage in open areas while there is less light intensity. This could suggest they are aware that predators are less likely to be active at dawn and therefore feel safer searching for food in higher-risk areas in the early morning (Nolan et al. 2020).

House finches had the greatest total number of feeder visits, greatly outnumbering every other species at both sites. This may be attributed to their more aggressive nature and persistence as a nonnative species. They are especially aggressive at feeders during winter and have displaced the native purple finch (*Haemorhous purpureus*) throughout much of the eastern United States (Shedd 1990). Mourning doves were also common visitors but were mostly found

near the open habitat since they prefer to avoid highly vegetated areas with lots of leaf litter as this can make it difficult for them to find food (Otis et al. 2020).

More data will be needed to see how feeder visit frequency and visit length changes between different habitats that are relatively close to each other. These variables may change with the seasons as species migrate to different habitats and the composition of avian communities shifts. Studies like these could help other researchers find out what kinds of species use bird feeders in different habitats and how factors like human development may change their foraging behaviors.

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