

Bird Feeding Experiment: Do Wild Birds Feed in a More Wooded or Exposed Area?

Josee Westrich and Mrs. Alice Garrity

Saint Catherine of Siena Catholic School, Kennesaw, Georgia

Summary

Two trial studies were performed in 2011 and 2012 to investigate the effects of habitat loss on birds by testing their food preference in wooded and exposed areas. Since research supported that habitat loss increased bird vulnerability, the hypothesis was that birds would preferentially feed in wooded areas as compared to exposed areas. A bird feeder was placed in each area over a course of one week for observation of the birds and measurement of the consumed food. On average, bird food consumption was found to be significantly higher in the wooded area than the exposed, showing that habitat loss plays a major role in dictating bird feeding habits as well as possibly their survival.

Received: January 25, 2012; **Accepted:** August 19, 2015; **Published:** July 16, 2016

Copyright: © 2016 Westrich and Garrity. All JEI articles are distributed under the attribution non-commercial, no derivative license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>). This means that anyone is free to share, copy and distribute an unaltered article for non-commercial purposes provided the original author and source is credited.

Introduction

To better understand the correlation between a bird's habitat and its feeding habits, we investigated whether birds would more likely eat in a wooded or exposed area. Habitat loss and global warming remain present-day issues that continue to place pressures on various ecosystems and their species. Two studies were performed to understand how these factors might be influencing bird survival rates. In the original study, a total of four trials were carried out in late fall during the months of October through November in 2011. In the second study, a total of six trials were carried out earlier in the fall during the months of September through November in 2012. Both experiments were carried out in a backyard from a home in Marietta, Georgia.

Habitat loss and global warming are two major factors that endanger the lives of many birds (6, 5). Habitat loss for birds may result simply from the destruction of forests, the development of houses and roads, or the spreading of forest fires (6). Such destruction might result in a species of birds becoming endangered (6). The National Audubon Society reported that habitat

loss has contributed to a loss of three-quarters of many songbird populations (3). The environment in which a bird lives helps that species to grow and survive (1). Placing stresses on its habitat could affect the birds' daily necessities such as food, shelter, and the right conditions needed for breeding (1). The construction of houses and the tearing down of trees for housing development are most likely the two main risks for habitat loss that places pressure on backyard birds (6). In *The Science Times Book of Birds*, Malcolm W. Browne describes how the destruction of these habitats allows for bird vulnerability to increase because they are at a higher risk of being exposed to predators (7). House expansion has led to bird losses because the areas they encroach upon are vital sources of bird food (7, 1). Because some birds prefer particular types of seeds for food, housing development has made it difficult for them to survive, although it can be noted that some species of birds adapt better to environments with urban atmospheres (4, 1). Furthermore, global warming is also another crucial issue that might be harming birds' resources (6). For instance, if a drought occurs, there could be a decrease in the bird's necessities, such as food, which may force a bird to move to a new area; thereby, increasing its vulnerability (6). Many different factors can endanger a bird within its habitat while obtaining food in an exposed area.

Because of these issues, the hypothesis was that birds would feed more in wooded areas as compared to exposed areas. Data from experimentation in both studies pointed towards higher amounts of food consumed in the wooded area as compared to the exposed showing that habitat loss plays a significant role in dictating bird feeding habits as well as possibly their survival.

Results

The effect of habitat loss on birds was examined through testing their preference for food in wooded and exposed areas. Two identical bird feeders were set up in each area and bird food consumption was measured after a course of one week for each trial. A total of four trials were performed during 2011, with an additional six done during 2012. On average, bird food consumption was significantly higher in the wooded area as compared to the exposed area for both studies (**Table 1**). All results were further examined using 95% confidence interval

	Exposed 2011	Wooded 2011	Exposed 2012	Wooded 2012
N	4	4	6	6
Mean	99	210.75	120.83	552.67
Median	72	198	128	499.5
Std. Deviation	85.24	65.15	61.37	304.39
Variance	7266	4244	3766	92652
Range	192	145	136	758
95%CI of the Mean	-36.62 – 234.62	107.10 – 314.40	56.42 – 185.24	233.18 – 872.16

Table 1. The table represents the statistics done for the trials completed in 2011 and 2012.

(CI) of the mean to validate the data received (**Figure 2 and Table 1**). For the 2011 study, overlap was seen in the SEM error bars, and the 95% CI of the difference between the group means included zero, which meant that the mean food consumed in the exposed and wooded areas was not different. In the 2012 study, there was little overlap in the SEM error bars, and the 95% CI of the difference between the group means did not include zero, which meant that the mean food consumed in the exposed and wooded areas was different (**Figure 2 and Table 1**). More trials however would be needed in order to better determine if bird's preference for food lies in wooded areas.

Discussion

Both trial studies done in 2011 and 2012 showed an increase in bird food consumption in wooded areas as compared to exposed areas, indicating that habitat loss plays an important role in bird feeding habits (**Figure 1**). The results from the experiment emphasize the importance of reducing habitat destruction for the betterment of bird survival. The hypothesis stating that wild birds will consume more bird feed in wooded

versus exposed areas was supported in the 2012 study, but not in the 2011 study (**Figure 2 and Table 1**). This was confirmed by comparing the 95% CI of the mean bird feed consumed. In the 2011 study, the data was not statistically significant because the 95% CI of the difference between group means included zero, and there was overlap in the 95% CI of the group means (**Figure 2 and Table 1**). However, for the 2012 study, the 95% CI of the difference between group means did not include zero, and no overlap was seen in the 95% CI of the group means, supporting the hypothesis that mean food consumed in exposed areas versus wooded areas is different (**Figure 2 and Table 1**). A primary reason for the differences in statistical significance between the two studies might be attributed to the fact that more careful measures were taken in the 2012 study as compared to the 2011 study. Several factors during experimentation might have caused complications to develop affecting the results obtained.

Bird feed could have alternatively been lost due to the weather, food spillage, or animals other than birds consuming the food at the feeders. Since both studies were performed outside in unconfined areas, it may

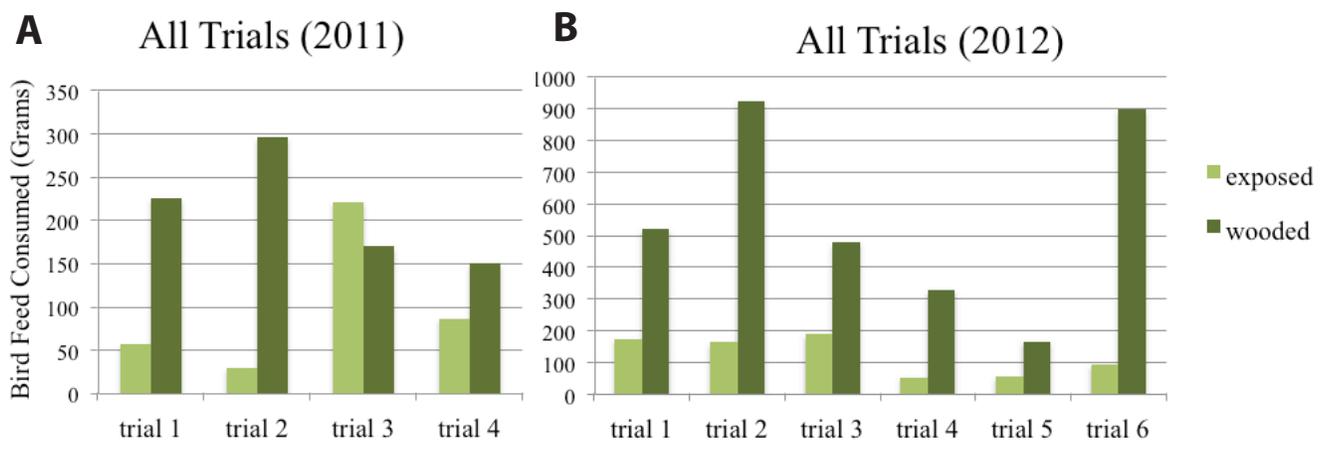


Figure 1. The amount of bird feed consumed in the exposed area in comparison to the wooded area. **A:** During the year of 2011. **B:** During the year of 2012. All trials were carried over the course of one week and each trial was carried out in designated exposed or wooded area.

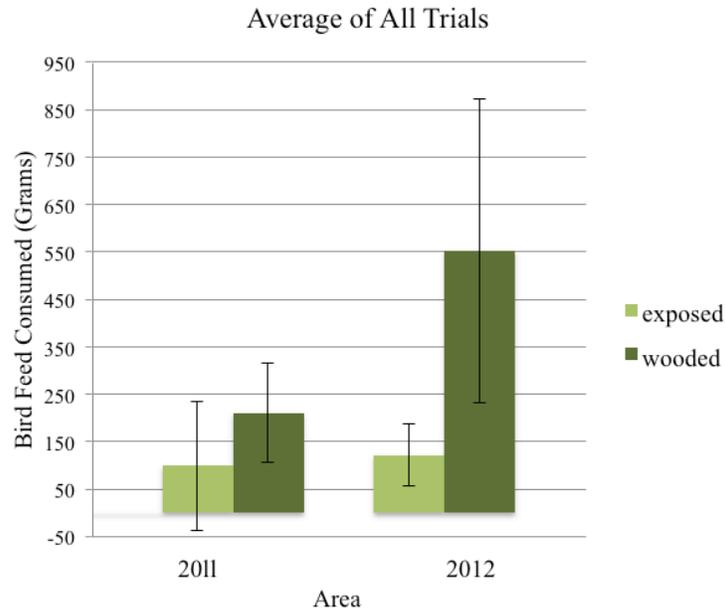


Figure 2. The mean bird feed consumed and the 95% CI of the mean calculated for the combined trials from 2011 and 2012.

be difficult to prevent other animals like squirrels from reaching the feeders in the future without limiting the birds' ability to reach them. However, food spillage may be prevented by placing a pan underneath each feeder while emptying out the bird food. Overconsumption of food due to migration can be an additional factor in this experiment since both trial studies were performed during the fall season. It can be noted that birdfeeders hung in wooded areas might allow birds to find a safer source of food, as this necessity helps to give a bird energy to migrate (2). Migration therefore is an important factor to take into consideration since it may increase a bird's preference for wooded over exposed areas.

Further research on bird's feeding habits and examining what endangers birds within their habitats would contribute to this experiment. Furthermore, since this experiment was done during both early and late fall, it would need to be done during a variety of seasons to see if the same results would repeat. Since the birds examined within this experiment have only been studied within one area, it would also enhance the study if different areas where other species of similar birds live could be researched. All of these factors combined would further determine if a bird's preference for feeding lies in wooded or exposed areas. Future possible applications for this study may be helpful for environmental science and endangered birds.

Methods

The bird feeders used in this experiment were placed in wooded and exposed areas over a course of one week per trial for observation of the birds and measurement

of the food they consumed. Both areas tested were in the backyard of a home. Areas varied in the distance they were away from the house and the amount of trees and shrubbery they contained. A set of binoculars were used to observe the types of birds that came to each feeder and to note whether other animals outside of the birds fed from them as well. Such observations were helpful in determining problems in the experiment that may have affected the results. The bird feed used for this experiment (Pennington The Bird Feed People, Classic Wild Bird Seed) attracts Northern Cardinals, American Goldfinches, Tufted Titmouse, Carolina Chickadees, Mourning Doves, Red-bellied Woodpeckers, Blue Jays, White-breasted Nuthatches, and Eastern Towhees. To protect against infestation, all bird feed was stored in a dry, cool area. Three medium-sized kitchen pots, one kitchen cup, and a 2-cup Pyrex measuring cup were used to calculate the amount of bird food consumed within each area.

Each bird feeder was of identical type and hung off of a wooden pole built into each area. The exposed bird feeder was placed a small distance away from dwellings to minimize any discomfort or hazard for the wild birds. For every trial, 1050 grams of the Pennington The Bird Feed People, Classic Wild Bird Seed was measured using a Pyrex measuring cup and balance, and transferred to an outside feeder with a medium-sized kitchen pot. Separate pots were used while transferring the bird food to the different areas in order to reduce the risk of the food from the exposed and wooded areas getting mixed. Both bird feeders from each area were monitored over a course of one week per trial and on the last day were

emptied into kitchen pots for measurement of bird feed consumption. The remaining bird feed in each feeder was measured in 210-gram intervals into one kitchen cup using a Pyrex measuring cup and a balance. Bird feed at each interval was transferred into a third kitchen pot while measuring. The mass of the kitchen cup was removed to give the mass of the bird feed found in the feeder alone. Bird food consumption was calculated simply by finding the difference from the initial 1050 grams of bird feed placed into each feeder. This difference was then reused to replace the bird feed lost in each feeder in order to prepare the bird feed to be set out for another trial. In order to determine the precision of the mean values of bird feed consumed, SEM was calculated on an Excel spreadsheet and displayed on a bar graph as error bars with the calculated averages of bird food consumption from each area. The error bars shown in **Figure 2** were calculated within 2 SEMs of the mean at a 95 percent confidence interval. If the estimates of the mean bird food consumption were close to what would have been expected in the wild bird population, then the error bars would have shown little to no overlap. With more trials, the SEM value decreases and the mean value becomes more precise, lending support to bird's food preference lying in wooded areas.

Acknowledgments

I would like to thank my mother, my brother, Mrs. Watson, Mrs. Tambasco, Mr. Zakrzewski, my scientific reviewers, and Harvard's Journal of Emerging Investigators Editors for their thoughtful and helpful support while working on this project.

References

1. Burger, Joanna. *Birds: A Visual Guide*. Richmond Hill: Firefly Books, 2006. Print.
2. Burton, Robert, Jane Burton, and Kim Taylor. *Bird Behavior*. New York: Knopf, 1985. Print.
3. Burton, Robert. *The National Audubon Society North American Birdfeeder Handbook*. London: Dorling Kindersley, 1992. Print.
4. Cortright, Sandy, and Will Pokriots. *Attracting Backyard Birds: Inviting Projects to Entice Your Feathered Friends*. New York: Sterling, 1995. Print.
5. Stutchbury, Bridget. *The Private Lives of Birds: A Scientist Reveals the Intricacies of Avian Social Life*. New York: Walker Books, 2010. Print.
6. "U.S. Birds Struggling to Survive Habitat Loss, Climate Change." *Environment News Service*. N.p., n.d. Web. 2 Jan. 2013. <<http://www.ens-newswire.com/ens/mar2009/2009-03-19-01.asp>>.
7. Wade, Nicholas. *The Science Times Book of Birds*. New York: Lyons Press, 1997. Print.