

The Feeding Habits of West Vancouver Birds

Abstract

In this experiment, I offered three different types of food (a seed mix, suet and peanuts) to my local birds, with the objective of determining what they prefer. My hypothesis was that the birds would preferentially consume suet because of its high energy content and relative ease of consumption. I observed the birds that visited the feeders for 7 hours and weighed the remaining food once each hour. The food that was most consumed was peanuts, followed by suet, then seeds. The results were somewhat distorted by squirrels hoarding the peanuts. I observed that small species preferred the seeds, while large species preferred peanuts and suet lied somewhere in between.

Introduction

Springtime in Vancouver sees the northward migration of many different bird species who have been wintering in the tropics. On a walk through your neighborhood, you'll likely hear the songs of your local bird population as they spend their days establishing territory and attracting mates. Migratory species such as these change their diet over the course of a year to suit their energy needs. The objective of my experiment was to determine whether my local bird population has a preference between peanuts, seeds, and suet during the breeding season.

During springtime, birds experience a period of relative abundance compared to the harsh winter. Plants are starting to sprout, and insects are returning. At this time, many songbirds are spending a lot of energy on nesting, defending territory, attracting or assessing mates, and breeding and raising young. All birds seek a high energy diet, and during breeding season they tend to build up their fat deposits. For females especially, building calcium and fat deposits is important, as the calcium is used to develop eggshells (Graveland, 1996), and fat deposits develop yolks and help compensate for limited feeding ability during egg incubation (Repenning & Fontana, 2011).

For this experiment I offered my local birds three types of food: first a seed blend consisting of oil sunflower, millet, safflower, and striped sunflower seeds, secondly bark butter nuggets made of corn, peanuts, rendered beef suet, oats, red pepper, soy oil and calcium carbonate, and finally raw peanuts in the shell. I chose these varieties of food because of their different fat and calcium contents, and also for their different methods of consumption. While the seeds and peanuts have to be removed from their shells (except for the millet), the suet can be eaten as is. Also, peanuts are much larger and therefore more “worthwhile” for birds to pursue eating, but also requires extra energy expenditure to break into the shell and carry the heavy seed.

The seed mix brand I used was Wild Birds Unlimited deluxe blend, which contains a minimum of 12% crude protein and 24% crude fat, and a maximum of 38% crude fiber. The suet was Jim’s Birdacious Bark Butter Bits with calcium, which contains a minimum of 8% crude protein, 27% crude fat, a maximum of 7% crude fiber, and between 0.2% and 1.2% calcium. The raw peanuts contain 22-30% protein and 44-56% fat (Arnarson, 2019), and contain very little calcium (0.026%) (peanut-institute.com, 2020).

My hypothesis is that my local bird population will preferentially consume suet over seeds and peanuts, because of its high fat and calcium content, and because consuming suet requires less energy than consuming seeds or peanuts.

Methods

For a complete list of materials, see the appendix.

I chose a clear morning when it was not raining, as rainwater collecting on the feeders would make it impossible to determine an accurate weight. I weighed the feeders while empty, then I

weighed 100g of each type of feed and added them into the three feeders and weighed them again. I hung the feeders equidistant apart and recorded the time. To record the types of birds that visited, I observed the feeders every 20 minutes for 1 minute at a time, and recorded the species, number and feeder that they appear on. One hour after hanging the feeders, I took them down and recorded their weight, before re-hanging them. I repeated this until the visits started slowing down, about seven hours.



Figure 1. The three feeders after filling with seeds, suet and peanuts (left), and after hanging on the post (right)

Results

Table 1. The mass of three different types of feed over the course of seven hours of feeding by species local to West Vancouver. The masses were taken at approximate hour intervals.

Time	Mass of feed in grams		
	Seed	Suet	Peanut
8:50 AM	102	106	102
9:54 AM	78	98	96
11:09 AM	86	86	4
12:08 PM	60	74	0
1:00 PM	54	58	0
1:53 PM	48	48	0
2:59 PM	40	34	0
4:12 PM	26	14	0

The results were collected over the course of seven hours. As seen in Table 1, the seeds and suet were consumed at a relatively steady rate throughout the day. The birds ate in total 76 grams of seeds and 92 grams of suet. Something important to keep in mind when considering the weight of the seeds is that the birds that fed on seeds often left the shells in the feeder. A significant portion of the final mass of the seeds may have been composed of empty shells.

The peanuts were the first to be completely consumed, as seen in Table 1. Most of the peanuts were consumed between 9:54 and 11:09 am.

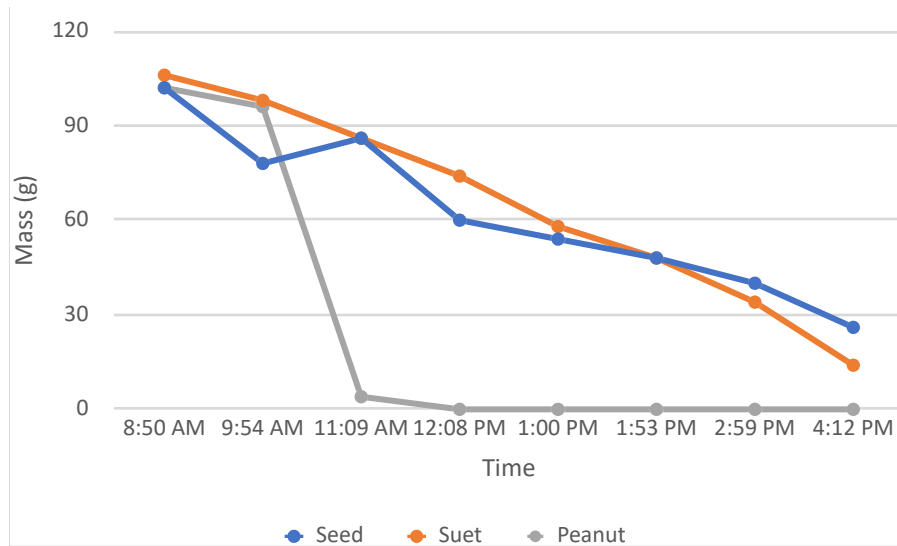


Figure 2. The mass of three different types of bird feed consumed by species local in West Vancouver, measured over a seven-hour period.

Figure 2 shows the relative rate of decrease of each of the three food types. During the first hour, all three feeds were consumed at about the same rate. During the second hour interval almost all the peanuts were taken. The rate of decrease of the seeds and suet remained linear and approximately the same throughout the entire seven-hour observation period.

Something to note, from 9:54 to 11:09 am, the mass of the seed mix appears to increase. As I did not observe anything added to the seed mix, my guess is that this discrepancy was caused by an error in the scale.

I used a t-test to compare the decrease in mass of the seeds and the suet. The null hypothesis (H_0) was that the slope of decrease was the same between suet and seeds, and the alternative (H_A) was that the two slopes were different. The p-value that resulted from this analysis was $0.64 > 0.05$, so the null hypothesis cannot be rejected, and there is no significant difference between the two slopes.

I chose not to compare the decrease of suet and peanuts, because the peanuts were, for the most part, consumed by squirrels, which highly skewed the results and made the data not viable for statistical analysis.

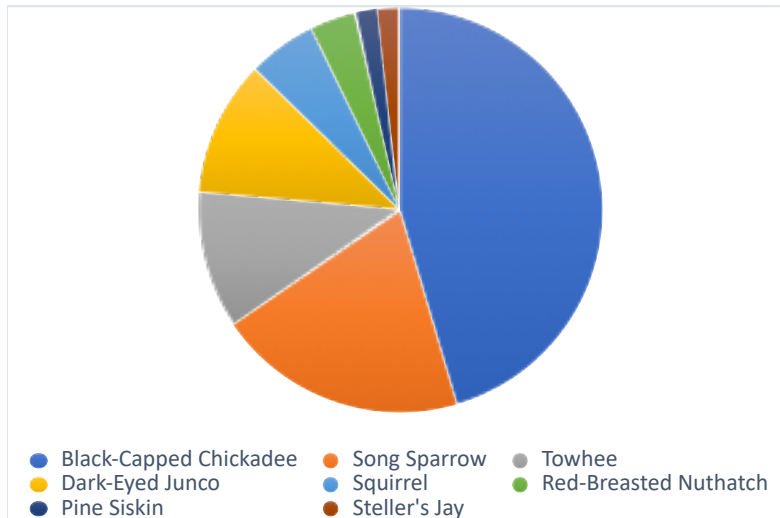


Figure 2. The distribution of local species that visited the feeders over a seven-hour period measured by their number of visits. A visit was defined by perching or standing on one of the three feeders.

Over the course of the experiment 52 observations were made, and I recorded 8 different species. By far the most common visitor was the black-capped chickadee, followed by the song sparrow, then spotted towhees and dark-eyed juncos. I observed only a couple pine siskins, Steller’s jays and red-breasted nuthatches.

Despite my best efforts, the feeders were also visited by squirrels. I wanted to avoid squirrels because the focus of this study was on birds and their dietary requirements during nesting season. Also, squirrels are able to stuff their cheeks and hoard large amounts of food all at once, so I was worried they would be able to remove most of the food in just a few visits. To prevent squirrels reaching the feeders I installed a metal squirrel baffle on the post the night before the experiment. This worked somewhat, but squirrels are known for defying the laws of

physics so inevitably a few managed to get past. When I saw squirrels at the feeder, I scared them away by knocking on the window, which may have also caused a change in my results.

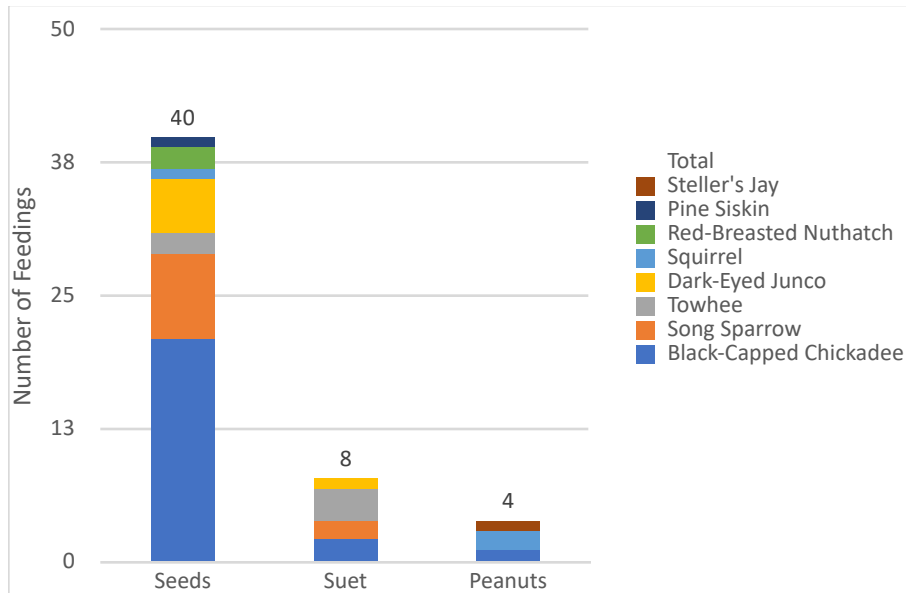


Figure 3. The number of observed feedings of three different types of feed made by species local to West Vancouver over the course of seven hours. The visits were grouped by species.

Figure 3 depicts the number of visits grouped by feed type. The most frequently visited feeder was the one containing seeds ($n = 40$), followed by suet ($n = 8$) then peanuts ($n = 4$). We can also see that some species demonstrate a preference for different kinds of food. For example, black-capped chickadees, song sparrows and dark-eyed juncos mostly ate seeds, while spotted towhees showed a slight preference for suet. Squirrels and Steller’s jays were only observed eating peanuts, and pine siskins and red-breasted nuthatches were only observed feeding from the seed feeder.

Discussion

My hypothesis was that my local bird population would preferentially eat the suet nuggets over the seed mix or peanuts. The experiment showed this to not be the case. The t-test showed that, suet and seeds were consumed at the same rate, while peanuts were consumed much faster as shown in Figure 2. The most consumed food was peanuts (102g), followed by suet (92g) then seeds (76g).

However, not all types of food were consumed by the same species. I believe that the real result here is in how the different species preferentially consume different types of food. For example, in figure 3 we can see that the most common seed consumers were black-capped chickadees (who have an average mass of 12g), while the most common suet consumers were spotted towhees (average mass of 41g) (masses taken from the Cornell Lab website), and the most common peanut consumers were squirrels (average mass of 540g) (Lawniczak, 2002). It seems as though small species tend to consume smaller and lighter food such as seeds, and larger species consume heavier foods such as peanuts.

In spring, both black-capped chickadees and spotted towhees consume mostly insects, but whereas chickadees are arboreal creatures, towhees are mostly ground feeders (Cornell Laboratory, 2019). Chickadees hunt spiders and other insects, and towhees hunt beetles, moths, millipedes and other larger insects (Cornell Laboratory, 2019). Considering their body size difference, it makes sense that chickadees would prefer small, easier to consume food than towhees.

Although this experiment gave provided no insight into the feeding habits of my backyard visitors based on nutrition, it did give me a lot of ideas for ways to adapt this

experiment in order to achieve more significant results. For one, it would be best to focus solely on birds of one body size, and only serve food of similar sizes. One way to do this would be to construct some kind of box or bird house around the feeders that has entrances sized for small birds such as chickadees. Then when offering different food options, I could pulse the food into a paste in a food processor, so that ease of consumption does not play such a factor in the birds' choice. I would also want to offer insects as one of the food options (such as ground mealworms or crickets, which can be purchased at a good pet store), as this is what wild birds usually eat in this area during spring and summer. Once the birds have adjusted to the new set up, I think this strategy could potentially prove to have interesting results.

Acknowledgements

I would like to thank Dr. Leander and the TAs of Bio 342 for their support on this project. Thank you to the helpful staff at Wild Birds Unlimited who taught me the basics of squirrel prevention, and to my parents for letting me occupy their kitchen and backyard for this experiment. This course, UBC Vancouver campus, and my home sits on the traditional, ancestral, unceded territory of the x^wməθk^wəy̓əm (Musqueam), Sḵw̓x̓wú7mesh (Squamish) and səlilwətəl (Tsleil-Waututh) First Nation.

Appendix

Materials

- 3 identical bird feeders
- A stand or hanging post somewhere you can observe
- 3 different kinds of feed. I used:
 - Shelled seed mix
 - Suet nuggets
 - Shelled peanuts
- A scale

References

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