Differences in Foraging Habits During the Day and Night Time in the Green Frog, *Rana clamitans*

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Abstract

There are three types of foragers: sit-and-wait predators, hunting predators, and optimal foragers. While these foragers look for their food, do they show exploitative or interference competition? I did my study on green frogs, *Rana clamitans,* at the University of Michigan Biological Station in Pellston, Michigan. I wanted to see if green frogs forage more actively during the daytime or at nighttime. I also wanted to see what type of foraging method did the frogs convey and why? I also wanted to see if the frogs portrayed any type of competition, and if they did if it was exploitative or interference competition. I hypothesized that the green frogs will hunt for their food during the daytime and display exploitative competition. I found out that the green frogs are sit-and-wait predators during the day but hunting predators at night. Therefore, they are more active during the night. During both day and night, the frogs showed the less aggressive act of exploitative competition. The results supported my hypothesis that the frogs are hunting predators and show exploitative competition; but refuted that the frogs forage during the day.

Introduction

A sit-and-wait predator will wait in one location for its prey, unlike most foragers who will actively hunt for food like cheetahs, which are considered hunting predators. Optimal foraging occurs when an animal chooses their resources based on a certain qualification: animals choose food that will give them the most energy in the least amount of time. An example would be the platypus. The adult platypus does not have any teeth so when they forage for food; they will sort out the food in their mouth and spit the food that they cannot chew out and then crush the remaining food with their bill.

While the animals are foraging do they show any competition with others? There are two types of competition: exploitative and interference. Exploitative competition is when an individual attempts to use up all the resources before another individual can use the resources. For instance, one study on competition for food between three frog species and found that each species showed exploitative competition (Inger, Greenberg 1966). Interference competition occurs when one individual tries to prevent another from obtaining the same resources as itself which involves aggressive behavior. Shore birds can show interference competition when food sources are low. They will attack and even kill each other to gain resources.

I wanted to see if the green frog, *Rana clamitans* portrayed exploitative or interference competition. I also wanted to figure out if the green frogs were sit-and-wait predators, hunting predators, or optimal foragers and what time of day they preferred to forage. Therefore, my questions are: 1.) Do green frogs forage more actively during the daytime or at nighttime? 2.)What foraging method does the green frog convey and why? and 3.) What type of competition, exploitative or interference, does the green frogs portray? I hypothesized that the green frogs will hunt for their food during the daytime and display exploitative competition.

Method

Study site

I did my study at University of Michigan Biological Station in Cheboygan County, Pellston, Michigan. I set up aquariums within my cabin trying to provide the best natural habitat. I collected the green frogs at the Maple River located off of Riggsville Road.

Procedure

I set up two aquariums and in each one I put in two green frogs. The habitat, I set up was half dry and half wet. On the dry side, I put leaf litter all over the bottom to cover the glass material and then I put dry logs and rocks for the frogs to bask on. The logs were propped up connecting the dry side to the wet side. For the wet side, I put a medium size glass bowl and used the same water from the river, which contained algae and vegetation. I used the bowl so I could keep the two sides separate. Then, I had a desk lamp located on an upper shelf to represent the moonlight for the nighttime feeding.

I fed the frogs ants and spiders during the day for the first four days of my experiment and then I fed the frogs the same food source during the night for the last four days. I attempted to put the food in the middle of the aquarium at all times. After I fed the frogs I backed away from the aquariums and observed how the frogs captured their food and recorded if they showed any competition in order to capture their resources. I did the experiment at the same time every day. During the daytime I would feed them around one o'clock in the afternoon while at night I would feed them at eleven thirty.

Results

During the day, when I put the food in the middle of the aquarium, the two green frogs did not move away from their territory. I observed that they waited for the food to enter their range where they could reach the source from where they were sitting. This method shows that the green frogs are sit-and-wait predators during the daytime. I repeated the same feeding procedure during my nighttime observations. Here the frogs portrayed a hunting predator characteristics; they had no qualms about moving around the territory in order to capture the prey. During both the day and night, the frogs showed exploitative competition, so the frogs did not show any aggression towards the other. In each aquarium, each frog had an equal chance to capture the food except during the day. The direction the prey decided to go determined which frog would receive their quota, otherwise there was approximately a 50/50 chance for either frog to capture the prey.

Discussion

For this study I did a qualitative instead of a quantitative experiment because I wanted to see if the green frogs were sit-and-wait predators or hunting predators and if they displayed exploitative or interference competition. The results showed that the green frogs are both sit-and-wait predator and hunting predators, but the frogs prefer that sit-and-wait method during the day and the hunting method during the night hours. It also showed that the frogs are exploitative during both day and night hours.

The purpose of this study was to gain more knowledge about the feeding habits of the green frog, since there are no publications on this subject. Arthur Freed did a study on the green treefrog's feeding selection in 1982 and a study on their prey selection and feeding behavior in 1980. He also did another study on the use of visual cues for prey selection in 1988. The only study that I found related to the green frog was based on their territories by researcher Bernard S. Martof in 1953. There is a select few studies based on the feeding habits on any species of frogs and I wanted to gain more knowledge so I can inform the public more about it especially since this is the field that I am interested in.

Literature Cited

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