

Please Join Us for Dinner:



Tropical Birds and Their Temporary Guests

Meet Dr. Latta

(Second from left):

I like being a scientist because of the adventure of working in wild places and the challenge of trying to understand the *ecology* of birds. I



Dr. Latta

think it is important to protect the *diversity* of living things on the planet.



Thinking About Science

When scientists observe what happens in nature, they often must create categories for things that they observe. Categories help them to *classify* their observations. Classifying is a way of grouping similar things together. This helps scientists

Glossary:

ecology (ē kā luh jē): The study of the interactions of living things with one another and with their environment.

diversity (duh vür suh tē): The quality of being different or varied.

classify (klas uh fī): To arrange by putting into groups according to some system.

analyze (an uh liz): To study or examine carefully.

summarize (sum uh riz): To make a summary or a brief report.

forage (for ij): Food for animals usually taken by browsing or grazing; the act of taking such food.

adapt (uh dapt): To change so as to fit new conditions.

mature (muh toor): Fully developed or fully grown.

species (spe sez): Groups of organisms that resemble one another in appearance, behavior, chemical processes, and genetic structure.

tropical (trăp i käl): Of, in, or like the tropics. The tropics is the region of the Earth near the Equator.

understory (un der stôr e): Vegetation in a forest that is near the ground.

migratory (mī gruh tôr e): Having a characteristic of moving from one place to another.

perch (purch): A tree branch that a bird sits on.

population (päp yoo la shun): The whole number of individuals of the same type occupying an area.

Pronunciation Guide

a	as in ape	ô	as in for
ä	as in car	u	as in use
e	as in me	ü	as in fur
i	as in ice	oo	as in tool
o	as in go	ng	as in sing

Accented syllables are in bold.

analyze and summarize what they discover. In this study, the scientists wanted to understand the *foraging* behavior of birds in the Dominican Republic, which is part of an island in the Caribbean (kä rib e un) Sea (Figure 1). By analyzing and summarizing their observations of bird behavior, the scientists hoped to better understand how different birds find food.



Thinking About the Environment

Even the same kind of animals might eat different kinds of foods. Over hundreds or thousands of years, animals have *adapted* to different environments where food is available. In this study, the scientists wanted to study the diets of birds. For example, some birds eat insects, some eat berries, some eat nectar (the sweet liquid from a plant), and some eat seeds. Some birds eat more than one type of food. When different



Figure 1. Location of the Dominican Republic in the Caribbean Sea.

kinds of birds eat different kinds of foods, they can live in the same area because they do not have to compete for the same food source. The same thing is true for other kinds of animals. Because of this, many different kinds of animals can live in the same area.

Introduction

Pine forests are common in the *tropical* Caribbean. Usually, these pine forests also

have an *understory* of broad-leaved trees. Broad-leaved trees are trees with flat leaves. The pine forests are the home of many different kinds of birds. Although scientists had studied the birds living in other kinds of forests, they had not studied the birds living in tropical pine forests. Some birds live in the pine forests all year. These birds are called residents (Figure 2). Other birds are *migratory*, living in

Thinking About Ecology



Diversity is an important quality for all *mature* communities of life. In a mature natural environment, it is important to have a diversity of *species*. This means that natural communities usually have

different kinds of animal and plant species. It is also important for differences to occur in the same kinds of animals and plants. Think about the community that you live in. Your family is different in many ways than other families in your neighborhood, and you are different in many ways

from other people. In the natural world, there is a diversity of other animals and plants. In this study, the scientists were interested in observing how different birds eat different foods. When there is a diversity of animals living in an area, there is food available for all of the animals.



Figure 2. Research assistant with resident bird.

the pine forests only during the winter months. Migratory birds fly from the colder north to spend the winter in the tropics, where it is warm. The scientists in this study wanted to learn what kind of food the resident birds and migratory birds eat during the winter months.



Reflection Section

- If you were the scientist, how would you study what birds eat in the pine forests?
- Do you think that different birds eat different kinds of foods in pine forests? Why or why not?

Methods

First, the scientists selected 12 areas in a large pine forest. These areas had trees that were typical of the trees in the larger pine forest surrounding the 12 areas. After they select-

ed an area, they drew an imaginary circle 16 meters in diameter (To find out how many yards this is, multiply 16 by 1.09). Then they identified the type of trees within the circles. The scientists observed the foraging behavior of birds by walking through different sections of the pine forest each day. They recorded the type of bird and the bird behavior they observed. To record how each bird was getting its food, the scientists classified the birds' foraging behavior into five types (Table 1). They also recorded four more things: 1) the species of bird, 2) whether the bird species was a resident or a migrant, 3) whether the bird was in the pines, in the broad leaf area, or in the overlap of the two areas when it was getting its food, and 4) how each bird was getting its food (Table 2 and Figure 3).

Type of foraging behavior	Description of foraging behavior
Glean (glean)	The bird remained on a perch and picked a food item from another surface
Jump	The bird jumped from a perch or any surface to get a food item
Probe	The bird poked or pecked into a surface to get a food item from below the surface
Sally-Air	The bird, while in the air, captured its food item from the air
Sally-Surface	The bird, while in the air, captured its food item from a surface

Table 1. Classifications of how birds captured their food.

Species of bird	Migrant (M) or Resident (R)	Seen in broadleafed area most of the time?	Seen in the mixed broadleaf/pine area most of the time?	Seen in the pine area most of the time?	Most often used foraging behavior
Ground warbler	R	Yes	No	No	Glean
Palm warbler	M	No	Yes	No	Glean
Broad-billed Tody	R	No	Yes	No	Sally-Surface

Table 2. Example of how the scientists summarized their observations.



Reflection Section

- Why do you think the scientists selected smaller areas to identify trees instead of the whole pine forest?
- How do you think the scientists knew that the trees in the 12 areas were similar to the trees in the larger pine forest?

Results

Seventy-eight percent of the birds foraged in an area between 5 and 10 meters from the ground (How many yards is this? See the “Methods” section above to find out how to calculate this). This is the height where the pine needles and the broad leaves overlap. Below 5 meters high and closer to the ground, the plants are mostly broad leafed. Above 10 meters, the plants are mostly pine trees. Most of the birds they observed in the Caribbean pine forests were



Figure 3. Forest with understory and broadleaf/pine overlap.

residents and lived there all of the time. The rest were migratory (Figure 4). Almost half of all birds ate insects, and the rest ate other kinds of foods (Figure 5).

Even though most of the birds ate insects, the scientists found that the birds used a lot of different foraging behaviors to capture insects. For example, birds gleaned (or picked) insects from leaf surfaces, they caught insects while flying in

the air, and they picked insects from surfaces while they were flying. Not only did the birds use different behaviors to capture insects, they usually captured insects from different surfaces or areas. The scientists found that the pine forest, with its broad-leaved understory, provided a variety of food for many different kinds of birds.

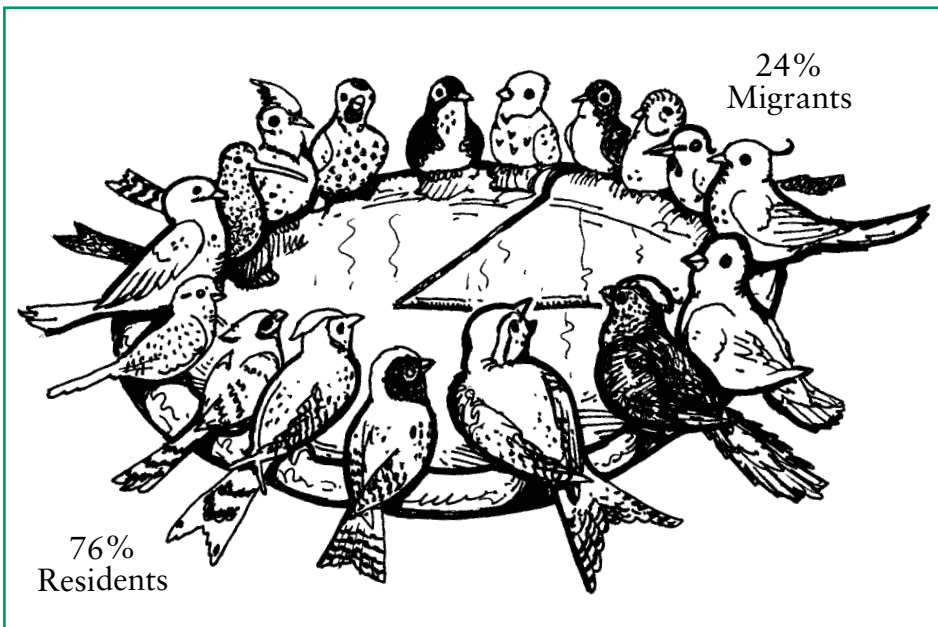


Figure 4. Percentage of permanent and migratory birds.

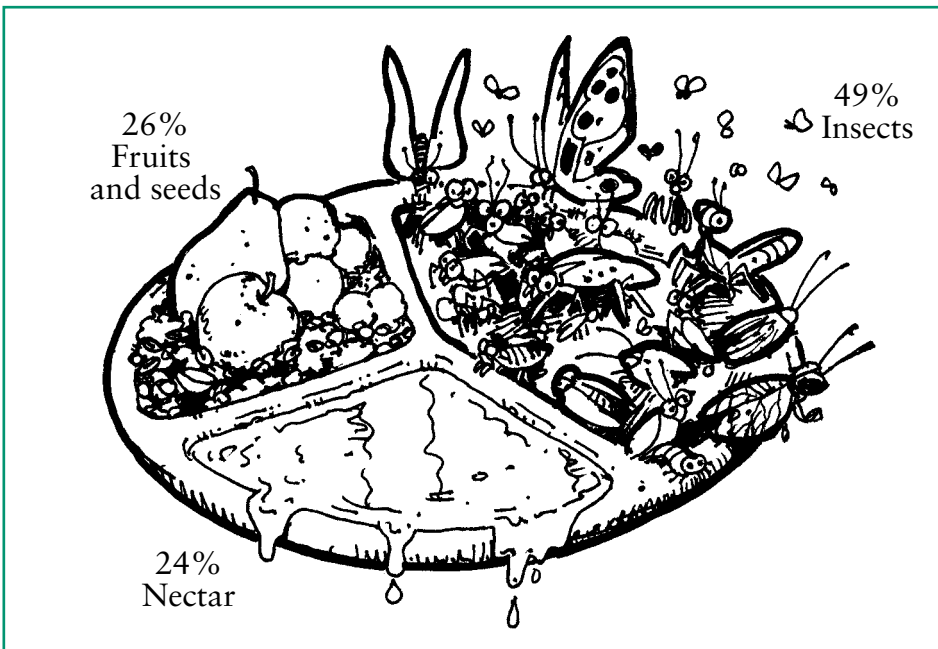


Figure 5. Food sources of birds in the Caribbean pine forest.

resident birds can live in the same place at one time. With this information, people can make sure that resident and migrant birds have the kinds of places in the tropics that they need to survive. By providing and protecting the forests that different kinds of birds need, people can help reduce the declining numbers of songbirds in the future.



Reflection Section

- A healthy food web is balanced between food sources

and the animals that eat the food. Think about insect-eating birds. What would happen to the population of insects if the birds were not there to eat the insects?

- How might protecting some tropical forests help reduce the declining number of songbirds in North America?



FACTivity

The scientists found that birds ate three kinds of foods. These foods were 1)

insects, 2) fruits and seeds, and 3) nectar. They also found that birds captured their food in the air, and they gleaned, jumped, and probed for their food (See Table 1). In this FACTivity, you will answer the question: What kinds of physical characteristics might



Reflection Section

- Name two examples of diversity described in this article. Think about the type of birds, the foods they eat, how they get their food, and the trees and plants where they find food.

- In what ways did diversity help the birds?

Implications

Throughout North America, the number of songbird species is declining. Many of those songbirds are migrants that live in the tropics during the winter. This study shows how migrant and

different birds have to help them capture their food? Here is the method that you will use to explore the question: You will need five large pieces of plain white paper and crayons. On each piece of paper, design a bird that captures and eats different kinds of foods. Pay careful attention to the kind of beak, wings, body shape, and legs the bird should have. You may want to design your birds in small groups, discussing how each part of the bird would help it capture the right kind of food.

Design a—

- Bird that gleans and eats seeds and fruit
- Bird that probes into flowers and eats nectar
- Bird that captures insects while flying
- Bird that captures insects by probing into trees
- Bird that jumps along the ground and picks insects off of the ground

After designing your birds, you may want to do some research on different birds to learn about the shape of their beaks, the size of their wings,

the shape of their body, and the length of their legs. You can explore different birds by using a bird identification book. Compare what you have learned with your own bird designs. What kind of physical characteristics do birds need to capture different kinds of food?

From Latta, S. C. and Wunderle, J. M. Jr. (1998). The assemblage of birds foraging in native West Indian pine (*Pinus occidentalis*) forests of the Dominican Republic during the nonbreeding season. *Biotropica* 30(4): 645-656.

Another resource: Bird Beak Buffet: <http://saveourlake.org/lessons/chpt2/act5.htm>.