

Feeding Adaptations in Birds

Ornithology – the scientific study of birds

Bird Diversity

Birds are unique because of their feathers; birds are the only animals with feathers, and all modern bird species have them. Yet birds are still incredibly diverse and can vary significantly in size, shapes, and color.

The way a bird looks and behaves is strongly dependent on what kind of food it eats. For example, a bird that eats seeds will have a differently shaped beak than that of a bird that eats fish. These differences are essential to the survival of many bird species. If all birds ate exactly the same food or lived in exactly the same kind of habitat, they would be in constant competition with each other. In an attempt to avoid the potentially fatal threats of competition, birds have developed special ways to adapt to unique environments.

An easy way to see these adaptations is by checking out a bird's beak. Most beaks are specialized to certain diets but there are two types of eating habits: generalists and specialists. Generalists like crows or blue jays will eat a variety of things while specialists tend to focus on a specific food type.

Seed Specialists

Birds with primarily seed diets tend to be the backyard song birds common to feeders: think of the birds that you may have seen such as sparrows, finches, or cardinals. Seed specialists have short, thick, pointed bills that need to be very sturdy and strong in order to crack open the seeds. The size of a bird's beak helps to indicate the size of seed or nut the bird is adapted to eating. For example, a small bird such as the American Goldfinch has a smaller beak perfect for eating small seeds like the thistle. Larger seed eaters like the cardinal are able to eat larger seeds like sunflower seeds.

The crossbill is a unique seed eater. As its name suggests, the tips of its upper and lower beaks are crossed and do not line up evenly. A crossbill uses its beak to pry pinecones apart.



Nectar Eaters

Hummingbirds have long and slender beaks that allow them to probe into flowers for their nectar. But, flowers differ in their size and shape, and as a result, beaks of hummingbirds vary in their sizes and shapes. Some are short while others are long; some are curved while others are straight. The way in which a hummingbird acquires the nectar from the flowers is not through their beak like a straw, as is commonly thought. Instead, the beak is just a protective tube for the tongue. The tongue actually has two troughs in it that transfer water upwards using capillary action, similar to the way water is drawn up through a paper towel, or water flows up the trunk of a tree. A

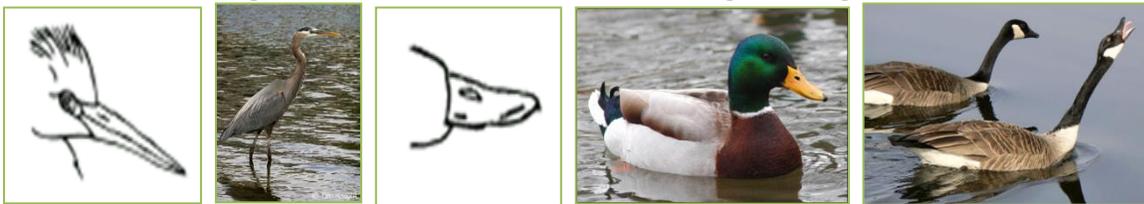
hummingbird's tongue is two times the length of its bill, and can be extended and retracted from three to thirteen times per second.



Water Feeders

Some birds that live in or around water, such as herons, kingfishers, and egrets, eat fish. These birds have sharp and spear-like beaks that are useful for hunting fish, frogs, and other small animals living in the water. When hunting, the bird will first stalk its prey by moving incredibly slowly through the water to avoid too much movement that would scare away the prey. When the right opportunity presents itself, the bird will strike very quickly, and swallow their catch in one big gulp.

However, not all birds that live near the water eat fish. Ducks and geese have long and flat beaks that are used for straining water and mud for aquatic plants. The water filters through small comb like structures lining the edges of the bill.



Hunters

Birds of prey, such as owls, eagles, hawks, and falcons, all have very unique adaptations. Raptors kill their prey with their feet, and then use their strong hooked beaks to tear the meat. Their incredibly sharp toes are called talons and are used to catch and kill their prey.

An interesting adaptation of most raptors (excluding owls, which eat their prey all at once) is a crop. A crop is a storage space at the base of the esophagus used for a variety of reasons. One is that the bird is able to save some food for a time when they are in need of extra nutrition. It also allows a bird to eat much faster and avoid having another bird come and steal the hard earned meal. The crop is also a place where the raptor can store indigestible items like fur and bones. Once all of these items are collected, they are compressed into a tight ball called a pellet that is coughed back up through the mouth.

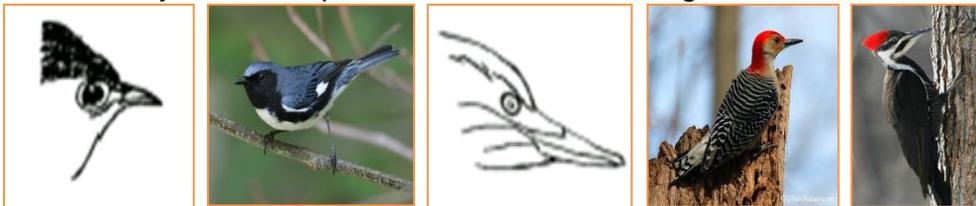
Owls have their own unique adaptation: silent flight. They achieve this with specially designed feathers that are very soft on top and have serrated edges, muffling any noises and giving the owl the advantage of sneaking up on its prey. Owls also have great eyesight and hearing that assist them when hunting in the dark.



Insect Eaters

Some birds that eat insects have thin, short, pointed bills for eating insects out of the air. It is not the expectation that smaller beaks would be advantageous for catching flying insects, but these birds are able to open their mouths surprisingly wide. And the small beaks are great for finding insects under leaves and between crevices in tree bark.

A more well-known insect eater is the woodpecker. They have long, chisel-like beaks for boring into the wood. A woodpecker has various adaptations unique to its specific lifestyle. A woodpecker's head moves quickly back and forth when it is drilling, up to 20 times per second! To prevent brain damage, a woodpecker's skull is thick and spongy. It fits very tightly around the bird's brain to minimize movement and impact. The woodpecker also has an impressively long tongue – three times the length of its bill. When not in use, the tongue is kept curled around the back of the woodpecker's head between the skull and the skin. Additionally, the tongue is covered in sticky saliva that helps the bird capture and extract insects from the holes that it has drilled. The woodpecker also has include stiff tail feathers and a unique toe arrangement, both of which support the bird as it moves up and down the tree and drills its holes. Most well-known song birds have three forward facing toes and one backward facing toe. Alternatively, the woodpecker has two toes facing forwards and two facing backwards.



Resources

<http://projectbeak.org/> is a simple and clear site that discusses the bird basics. It also offers a variety of fun activities, both virtual and actual.

<http://www.birds.cornell.edu/physics/lessons/elementary/pdfs/tm> is a series of lessons designed to teach a variety of concepts related to birds and their environment.

<http://www.birds.cornell.edu> is the website of Cornell Lab of Ornithology. It offers a diversity of material from education tools to bird identification help. It's a great site to explore!

Get Involved!

<http://feederwatch.org/> is a nationwide citizen science project run out of the Cornell Lab of Ornithology that involves birdwatchers all over the country tracking broad scale movements of winter bird populations and trends in bird distributions. It is relatively easy to get involved with and a lot of fun for anyone who enjoys watching birds!