

## Explore January: The Yellow-bellied Sapsucker



Yellow-bellied sapsucker? *Really?* Everyone knows this is just a giggle-inducing name for some ridiculous cartoon character, right? *Wrong!* Not only is this a real bird, but it's a bird that is considered a keystone species in forest ecosystems. This means it plays a critical role in providing food and shelter for other species that share its habitat.

*Sphyrapicus varius* is a small woodpecker, about 8.5 inches in length. The female sports a red crown while the male has a red crown and throat. Both have black and white face stripes, and their backs are mottled with black and white plumage. Both also have distinctive white wing stripes that are visible both at rest and in flight. Juveniles are mottled dusky gray and black and lack the red head feathers.

Like all woodpeckers, the yellow-bellied sapsucker excavates nest cavities in snags and dead limbs of trees that are subsequently used for nest sites or shelter by many other animals like other birds, squirrels, and spiders. Sapsuckers get their name from their habit of boring holes into the cambium layer or inner bark of live trees to access the nutrient-rich sap that runs up and down the trunk. And yes, yellow-bellied sapsuckers do have yellowish feathers on their bellies.

Sapsuckers [drill holes](#) in many species of trees but their favorites are maples and birches as these are the trees that have the sweetest sap with the highest sugar content. When a woodpecker finds a tree to "tap", it will drill two different types of holes, round and rectangular. The bird drills round holes deep into the trunk to probe for sap and insects with its sharp bill and long brush-like tongue. It drills the rectangular holes closer to the surface in the bark and must constantly redrill them to keep sap flowing out of the holes.

[Sap moves](#) up from the roots of trees in spring via the xylem layer to fuel the outer branches and leaf growth. In late summer and fall trees move nutrients from the leaves down into the roots via the phloem for storage over winter. Sapsuckers drill more shallow, rectangular wells into phloem tissues during early spring before buds leaf out, but at this time of year the more nutritious sap is in the xylem. The underlying xylem tissues (bringing sap up to the branches to fuel leaf growth) have higher sugar content and sapsuckers will drill deep round holes right through the phloem to reach the more sugary sap.



Male yellow-bellied sapsucker drilling round sapwells. Note the red throat and crown.

The woodpeckers make slits in the bark to start the phloem wells and gradually chip them into rectangles. They do not yield the quantity of sap that xylem wells provide. Xylem wells that sapsuckers drill are deep, round holes. In both cases, new holes are usually made in line with old holes or they drill a line of new holes directly above a line of old holes. The effect looks like a human came along with a hammer and nail or a chisel and made a line of holes in the tree for the fun of it. The birds return again and again to the same tree to suck up the oozing sap or maintain the sapwells to keep them flowing. They aggressively defend their wells against other marauding animals and insects.



*Female sapsucker drilling shallow rectangular sapwells. Note the red crown.*

This feeding behavior is the most distinctive feature of these woodpeckers. Sap contributes significantly to their diet, and most of their foraging time is spent drilling, maintaining, and feeding from sapwells. Sap however is not their only food and in fact, makes up only about 20% of the overall diet of this species. They rely on sap more when its sugar content is higher in early spring, when insects are scarce, and when the birds need extra energy during molt and migration. When the weather warms, most of the remainder of the diet consists of insects, especially ants. Sometimes they will dip insects into the sap before they swallow them. Sapsuckers will also eat fruit, seeds, and leaf buds.

Like most woodpeckers, the yellow-bellied sapsucker is primarily a forest species. It tends to favor early successional woodlands, wetlands and riparian corridors where maple, aspen, and birch stands are abundant. The yellow-bellied sapsucker breeds mostly in the boreal forests of Canada. Its [breeding range](#) extends from east-central Alaska to southern Newfoundland and dips south into the northern United States. Canada's boreal forests support roughly 55% of the population.

Yellow-bellied sapsuckers [migrate](#) as far south as Mexico and Central America for the winter. In spring, males fly back to the northern breeding grounds about a week ahead of females and establish territories by means of the [drumming](#) (banging their beaks on wood like beating a drum.) Sapsucker drumming is often described as someone tapping out morse code; the sapsucker drum consists of a short drum roll followed by a pause and then several individual strikes. In addition to drumming the males do make squealing [calls](#) and nasal mewling sounds to establish territory and call mates.

Both sexes often return to the previous year's nest territory, so males and females often renew their pair bonds the next breeding season. They often use the same tree for nesting each year and sometimes even the same cavity. If they make a new one, the male does almost all the excavation over a period of one to three weeks. Females help with excavation when time is short, such as after failed nest attempts. Cavities are most often made in dead deciduous trees, especially quaking aspen infected with heartwood decay fungus.

The female lays four to six eggs on wood chips that drop into the cavity from excavation. The eggs are incubated by both sexes for 10-13 days and the young fledge over a 2-3-day period at about one month of age. The parents lure the young out of the nest with food, and the fledglings do not reenter the

cavity. Family groups remain together near sapwells, the young gradually learning to feed themselves, first on sap and then later consuming insects. Sapsuckers only raise one brood per year.

Yellow-bellied sapsuckers are common sites at Duke Farms, especially during migration in spring and fall. Their sapwells line the trees in the Sugar Maple groves near the Hay Barn and often help to feed squirrels, insects and even hummingbirds when they return in April.

Look for the sapsuckers in late winter when the sap of the sugar maples starts flowing. The birds cling motionless to trees while calling, so if you hear a yellow-bellied sapsucker, look closely at the trees around you for their black-and-white face stripes and the bright-red patches on their heads. They may make you smile to see them, but you'll never think they are ridicules again!

### Additional Resources

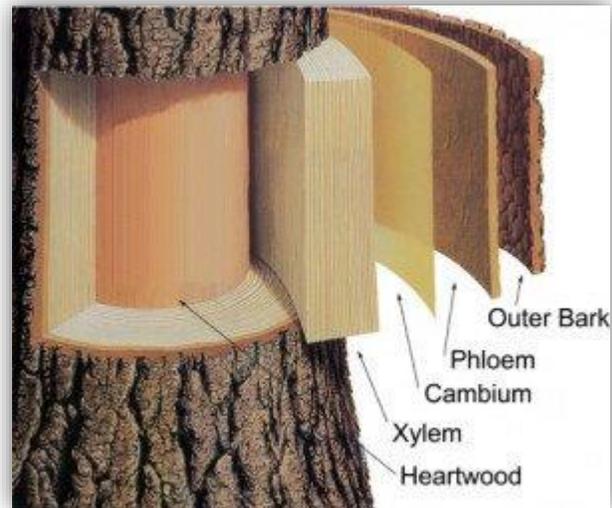
- [E-bird, Yellow-bellied Sapsucker](#)
- [All About Birds, Yellow-bellied Sapsucker](#)
- [Sapsucker damage on trees](#)
- [Woodpeckers of Duke Farms](#)
- [How Sap Runs](#)

\* All bird photos courtesy of the Cornell Lab of Ornithology, Macaulay Library, Ithaca NY

### Activity 1: Tree Trunks and Sapsucker Sapwells

Look at this diagram\* of the trunk and bark of a tree. Answer these questions:

- Into which layer of the tree does a sapsucker drill deep round holes, called sapwells?
- Into which of the layer do they chip away rectangular holes?
- Do the rectangular holes provide sap to the woodpeckers?
- Do the round holes provide sap to the woodpeckers?
- Do the round holes provide sap to the woodpeckers?
- Which holes access sap with higher sugar content?



*\*Tree Diagram courtesy of Land Trust of Alabama, Huntsville Alabama, 2018*

### Activity 2: Go on a Sapsucker Sapwell Hunt

Go on a nature hike in a wooded area. At Duke Farms, a great place to look is in the woodlands around the Hay Barn. Sapsuckers especially love sugar maple trees because their sweet sap and there are many sugar maples in that area. Look at the bark of trees along your path and try to find holes made by sapsuckers. Remember the sapsucker drills holes that appear in lines. Sometimes they are round and sometimes more rectangular.

For further investigation, count the holes at each place you have located the marks on the trees. Are they all the same number or different? If they are different, why do you suppose they are? Do you notice a pattern of which side they have been found on the tree? If so, what might be a hypothesis for further studies? Design an experiment related to a question that needs further investigation and how would you confirm your thinking? What types of technology might you use to allow for a better understanding of the birds' behavior?



### Animal Architects and Geometry

While yellow-bellied sap suckers create rectangular or round holes in trees, there are many other animals that also create geometric patterns and structures.

- **Honeycombs** are built by honeybees with each cell a hexagon. *Why a Hexagon?*



Photo source: npr.org

The hexagon is the strongest shape known, are efficient structures, and can hold a great deal of weight. Each line is as short as it can possibly be if a large area is to be filled with the fewest number of hexagons. This means that honeycombs require less wax to construct and there are no vacant spaces between cells. This means it *tessellates* perfectly.

- The American robin builds a **nest** that is round – it is almost like you cut a sphere in half. *Why are the eggs well protected with this design?*



- How many shapes can you find in a spider web? *Can you measure the obtuse and acute angles?*



### **Next Generation Science Standards**

Teaching about yellow-bellied sap suckers, investigating their holes in trees and extending the learning to geometry and what animals build relates directly to NGSS Next Generation Science Standards.

For example, Cross Cutting Concepts / Science and Engineering Practices:

Science and Engineering Practices describe what scientists do to investigate the natural world and what engineers do to design and build systems. The practices better explain and extend what is meant by “inquiry” in science and the range of cognitive, social, and physical practices that it requires. Students engage in practices to build, deepen, and apply their knowledge of core ideas and crosscutting concepts.

### **Elementary Standards**

In the earlier grades, students begin by recognizing patterns and formulating answers to questions about the world around them.

*For more information about the interdisciplinary applications, contact Kate Reilly, Manager of Education, Duke Farms. [kreilly@dukefarms.org](mailto:kreilly@dukefarms.org).*