OTTAWA CITIZEN

Science of spring: Why trees are the last plants to green up

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A typical spring day: Puddles, budding trees and a cyclist riding along the trail. / Veronica Henri, Toronto Sun

With people stuck at home and worried about their future, there is no better time to remind ourselves of the wonders of spring. The change of season is all around us with many facets of backyard biology, perhaps even things your kids might want to learn. In today's Science of Spring, Tom Spears looks at nature's timetable for greening up.

Trees often look as though early spring is passing them by as they stand, grey and leafless, while lawns turn green and early flowers bloom.

In fact, the tree is busy during this season, especially the deciduous trees that dropped their leaves in the fall. But all their work in April is under cover.

Like a car that spent all winter in a snowbank, the tree has a big job coming back to life. Sally Aitken, a researcher and associate dean of forestry at the University of British Columbia, leads us through it.

“The thing about being a tree is you’re stuck there all winter in the cold,” she said. “You’ve got a big stem and you’re very exposed to the cold,” unlike little perennial plants that die back above ground and shelter underground. Some of these even have ready-to-use food in bulbs.

The evergreens have less work in spring than deciduous trees. They have kept their leaves (needles), and can start photosynthesis — using sunlight to make food — as soon as temperatures warm up and there’s enough sunlight.

They will also grow new leaves, but these are sensitive to frost, so the tree waits a while and depends on its tougher older needles in the short term.

Deciduous trees — those that drop leaves — have a spring routine dictated by the anatomy of wood.

“If you look at an oak, for example, you can see pores in that wood — big dead cells that are open,” Aitken said. “They are like straws, one stacked on the next. Or pipes.

“And those specialized cells move water.” They are the tree’s plumbing system, and for months they have not had any liquid water to move. The tree needs a drink.

The problem is that some trees build relatively large pipes to move water in large amounts in spring, but these are vulnerable to developing air pockets. “You get air in the cell instead of water and then the stack of cells can’t transport water any more.”

This often happens over the winter. Water in the plumbing system freezes, and squeezes out dissolved gases which form bubbles in the ice.

When this happens, the vessels often can’t recover. “And what the tree has to do is produce a new set of pipes before it can leaf out. Or around the same time (while producing the pipes) it can leaf out. It has to have a plumbing system to get the new leaves.

“So in those species, like oaks, the wood will start growing before the trees leaf out, and produce a new plumbing system for the year.”

There are other species that only produce smaller vessels all through the growing season, and they suffer less damage from air bubbles. They can get busy growing leaves without as much delay.

While trees wait for accumulated warmth, some are also influenced by a second signal — shorter nights. (Aitken says this is less important than the warmth.)

“All of this is about synchronizing with the season,” she said.

And the unique timetables of trees affect other species.

“If you think about the understory (the part of a forest down near ground level) you get those beautiful flowers” in early spring. “Things are constrained by when it gets warm enough. But if the overstory trees are deciduous, there is lots of light available for those very early spring plants, so … they can photosynthesize and grow and flower before they are heavily shaded” by trees.

These include trilliums, bloodroot, marsh marigolds and trout lilies in the forests of our region.

“The result is that we get this beautiful sequence of plants that really give us a sense of season because things are happening at different times.”

Source: **https://ottawacitizen.com/news/local-news/science-of-spring-why-trees-are-the-last-plants-to-green-up/**