Conservation Corner

*Conservation Corner is a weekly article produced by the Forest County Land &Water Conservation Department. For more information contact Steve Kircher, County Conservationist-Land Information/GIS Director at 715-478-1387 or by e-mail at* [*lcc@co.forest.wi.us*](mailto:lcc@co.forest.wi.us)*.*

In my yard I have a massive old maple tree. There’s a hole in this tree that gets bigger every year. My wife and I are waiting for the tree to fall and looks like it will land in a place that won’t damage too much. Visitors to our place always ask how it’s still alive with such a big hole in it.

Well, I thought I’d take a minute to explain how it’s still alive. It begins at the roots. When a seed germinates, it sends out a tiny root that anchors to the soil and starts water intake. Trees grow several kinds of roots; taproots and lateral roots. Tap roots grow deep into the soil, and the lateral roots are shallow and closer to the ground. About 85% of a tree's roots are within 18" from the top of the ground and these lateral roots extend almost two times the branch length of a tree?

These taproots and lateral roots are big and strong, containing cells for the storage of sugar (food for the tree made by leaves). As these roots spread out, they branch into smaller roots called rootlets. Rootlets are covered in tiny hairs that actually suck in water and nutrients from the soil, needed for tree survival. These are tiny but mighty roots as they will cling to the soil and protect from erosion.

Within a tree’s trunk, are tubes made of cells. These tubes are like pipelines that conduct water and nutrients absorbed by those tiny but mighty roots, up to the leaves. There are two major tubes of cells. The phloem (inner bark) serves as the sugar pipeline, carries sugar made by the leaves back down the trunk. The Xylem or sapwood are the pipeline that carries water up the trunk to the leaves.

Tree stems grow vertically while their branches grow horizontal at their tips, as well as a tree’s roots. This is because of cell division at the tips, called the meristems, which are zones of intense activity. They are where all new cells are formed and where they expand. But what about cell division that takes place for the tree to grow in diameter? Cell division is also still happening inside the tree stem in an area called the cambium. This layer is in between the bark and the wood. New cells formed in the cambium move outward to become phloem cells, other new cells formed will move inward to become xylem cells. This layer of new cells creates new wood on side of the cell, and new bark on the other. This is increasing the tree's internal girth as the cambium moves outward, pushing the bark. Each spring and summer the cambium makes these new cells and wood layers. The wood formed in the spring grows fast and is lighter because of the cells are big and filled with moisture.

The wood formed in summer grows slow and is darker colored because there is less moisture filled in the cells, therefore the cells are small. That's why when you cut a tree, you see light and dark alternating rings.

Of course, we all know that not all trees are the same, therefore, they do not all grow the same. There are differences between habitats, temperate zones, and between deciduous and evergreen species. A tree's maximum height is more related to its longevity than its annual growth rate when young. Also, different species grow faster at different times. Some species are fast growers when young, like Aspen, whereas other species may grow slower when young, such as Oaks. Environmental factors contribute to growth rates such as the amount of moisture, temperature changes, nutrients found in the soil and injuries to the tree.