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Life in a Tree Cookie

The life of a tree is seen inside its rings. There, a careful observer can find out the age of the tree, when it lived through hard times, or when it grew fast. A cross section of a tree can be a tool in studying the changing quality of the environment and the human history of the local area.

A ***tree cross section***, or "tree cookie," is made of layers of rings, each with its own purpose. Starting from the outside, the ***bark*** protects inside layers from attack by insects and disease. It also keeps out wetness during rain and keeps the tree from drying out during dry times.

Just inside the outer bark is the ***inner bark*.** This layer is made of phloem cells. These cells move sugars made in the leaves down to the rest of the tree. Phloem cells are short-lived and soon die, becoming part of the outer bark.

The next layer is where the tree grows wider. This layer, called ***cambium***, is made of living cells. These cells make new bark on the outside and new wood on the inside of the tree.

This new wood is called ***sapwood***. It is made of living xylem cells that move water and nutrients from the roots to the leaves. Each year new layers of sapwood are made. Slowly, the inner cells die and change to ***heartwood***.

Heartwood gives strength to the tree. Even though it is made of dead cells, heartwood stays strong unless attacked by insects or decay. At the center of heartwood is the ***pith***. The pith is where the tree first started to grow.

Inside sapwood and heartwood are the ***annual growth rings***. These are counted to find out the age of a tree. One light and one dark-colored ring show one year's growth. Wider light-colored rings are called **springwood**. They are formed in spring when water is abundant and the tree grows fastest. These rings are made when cells are larger and full of water. Narrower, dark rings are called ***summerwood***. They are formed during the summer when growth is slower. These rings are made when cells are smaller due to less rainfall and available water.

Life in a Tree Cookie, continued

In times of drought, narrow rings are formed. Good growing conditions make wide rings. If too many trees live in one place, none of them will grow well. This is called ***overcrowding***. Trees that are over crowded have narrow, tight growth rings. Cutting, thinning and natural causes such as tornadoes, hurricanes and wildfires, "releases" the remaining trees and makes wider growth rings. This is because fewer trees compete for sun, water and nutrients.

Some other things may be noticed on the tree cookies or cross sections are:

1. Bluish colored stain (blue stain). It is caused by a fungus and can enter the tree via bark beetles that have the blue stain fungus on their legs. As they bore into the tree, the fungus is deposited and grows. The fungus is transported to the interior of the tree through ***rays*** (appear as short lines running perpendicular to the growth rings).
2. Old branch scars where branches once grew when tree was younger.
3. Insect or bird damage that may appear as small dots along one or several growth rings.
4. Rays
5. False rings. Formation of two rings in one season can be caused by drought or defoliation by insects causing a temporary slowing of growth.