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What is a Tree?

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by Greg Van Fosson

Being a forester, I often get asked the question, "What kind of tree is that?" I usually don't have any trouble answering this question. But the other day I was asked to define what a tree is. When I began to answer, I suddenly realized that defining a tree isn't that simple. Before answering right away, I decided to think over the question. The following describes how I arrived at my definition of a tree.

Because trees have weight and occupy space, I believe we can all agree that trees are matter. But is a tree living matter or non-living matter? Living matter, as I learned in Biology 101, is made up of many cells. These cells, within the living matter, multiply and divide by a process called mitosis. This process gives living matter the ability to "grow" and reproduce itself. Animals and plants both grow and reproduce by this method. Non-living matter, however, does not have the ability to grow or reproduce. For example, rocks don't grow in size year after year, and I have never seen a rock reproduce itself. But as I stated earlier, living matter can be plant or animal. Since this is true, is a tree plant or animal?

Once again, if we think back to our basic biology, we would remember that animals move from place to place in search of their food. Plants, on the other hand, are stationary and require their food to come to them. We might also remember that animals and plants require oxygen and carbon dioxide respectively, but their requirements for the element oxygen and the compound carbon dioxide differ.

Animals breathe in oxygen and give off carbon dioxide, whereas plants take in carbon dioxide and give off oxygen. Hence, animals are dependent on plants for food and oxygen. With this in mind, I believe we can say a tree is a plant because a tree does not move around, does not breathe oxygen, and does not depend on animals to survive. But is a tree woody or non-woody?

A woody plant and a non-woody plant differ in three basic ways: top growth, age or longevity, and texture. Both the woody and non-woody plants produce top growth each year but with two differences. The top growth on a woody plant is called a stem or bole, and once stems are produced, they don't die back each year like a non-woody plant. Instead, they continue to grow in height and diameter. We all have seen evidence of this when we look at the growth rings of a tree or shrub. Another example is the grass in our lawns. Each spring and summer the grass in our lawns grows, but when fall and winter arrive the grass turns brown and dies.

The second difference is the age of the woody and non-woody plant. Woody plants (trees and shrubs) live from 10 to 30 years for aspen, to as old as 6,000 years for bristlecone pine. Non-woody plants (grasses), however, live from one year for annual weeds to three to five years for perennial grasses. Although some non-woody plants like amaryllis or tulips may live ten years, they do not produce a stem or bole that continues to grow in height and diameter.

The third difference is the texture of the plant itself. As the name implies, woody plants are woody and fibrous. Most animals cannot eat woody plants except for the leaves. Non-woody plants, though, are soft and palatable and the entire plant can be eaten. Since a tree has a stem or bole, longevity, and a woody texture, I believe we can say that a tree is a woody plant. But a shrub also has these characteristics.

A shrub and a tree differ in two basic ways: the number of stems and the total plant height. A shrub, when full grown only has one stem. For instance, the burning bush shrub has 10 to 30 stems and the giant sequoia has just one. The difference in height between the two is astounding with the height of the burning bush only reaching 5 to 10 feet and the giant sequoia reaching up to 325 feet.

After some deep thinking and lengthy comparisons, I finally arrived at a definition of a tree. A mature tree is a living, woody plant that has a single stem or bole which grows each year in diameter and height.