Yard and Garden – 11-29-2014 – Ted Griess/Extension Horticulture Assistant

Trees are one of the longest lived and largest organisms on earth. Trees use energy so efficiently that very little waste occurs. Wood is stored energy in the form of cellulose. New living wood is always being created transporting nutrients, sugar and water. Toward the center of the tree is the non-living heartwood. As long as it remains healthy, heartwood continues to offer structural support to the tree.

Everyone knows, trees can't move. They must stand in one spot, 24/7, with no way of protecting themselves. Throughout their lifetimes they are wounded many times and in many ways. No matter how frequently trees are wounded, they attempt to survive; and yet, they do not have a wound healing process. When we humans are injured and flesh is cut, new cells form in the area of the cut regenerating the injured area —a term called healing. Trees do not heal. They close their wounds.

Over millions of years, trees have developed the genetic ability to build chemical boundaries surrounding a wound and close it off — a process called CODIT (compartmentalization of decay in trees). Although the wounded area remains for the life of the tree, through time, a callous of living tissue forms, eventually encircling and closing the wound. Some trees have a high capacity to create these protective barriers; others do not. Trees that are not able to build effective boundaries decay rapidly following injury. To know which trees compartmentalize well and those that don't, I suggest you check the website http://hort.ifas.ufl.edu/woody/compartmentalization.shtml

In the summer of 2011, I received a call from my friend Barry Sherman of Kearney. A few days prior, Barry's thirty-to-forty-year-old black walnut trees, growing in his front yard, had been struck by lightning. When I arrived at his home, I could see areas on the trunks and on some of the large branches where the bark, had been literally blown away exposing the sapwood beneath. Barry was deeply concerned whether his trees would be able to survive such trauma. I told him, "It's questionable; we simply need to wait and see. Only time will tell." I recently returned to Barry's property for another look at the trees. Needless to say, I am thrilled they show compartmentalization, or CODT, at work. There appears to be little decay, and the wounds are closing. Fortunately, walnut trees are one species that has the high capacity to build these unique compartmentalization barriers.

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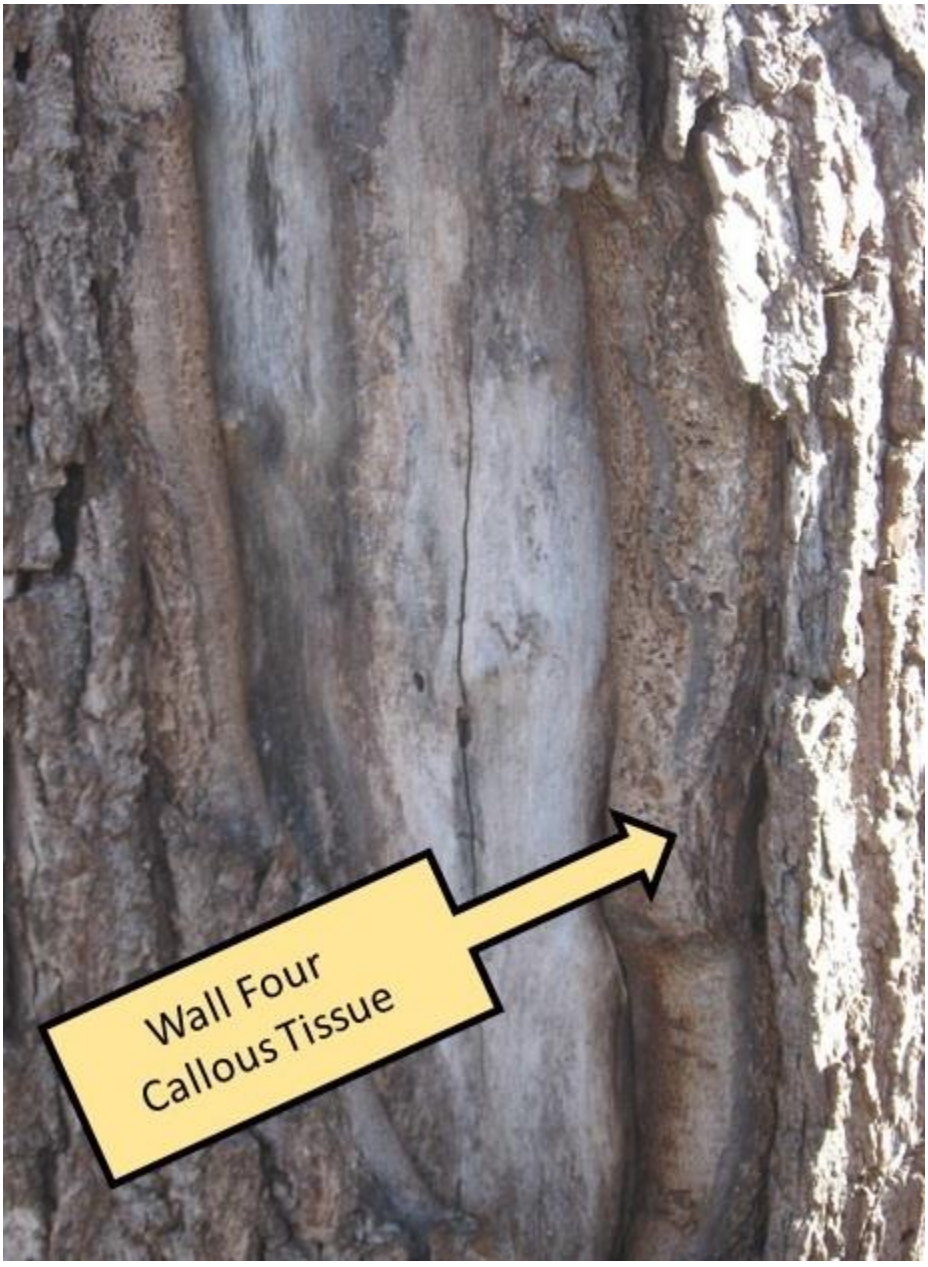
Plant pathologist, Dr. Alex Shigo (1933- 2006), devised the theory of CODIT. His discovery has led to many changes in the tree-care industry. Decay is the breakdown of tissue resulting in the loss of strength to a tree. According to Shigo, compartmentalization is the process whereby a tree reacts to injury by creating a wall around it, thus minimizing decay. This disease-fighting resistance is said to have four walls. The first three are actually not walls but rather chemical barriers created by localized tissue to contain the injury and the spread of pathogens.



Walls one, two and three occur immediately after injury. In wall one, the conductive tissue called the xylem immediately plugs with chemicals above and below the injury to stop vertical movement of decay. Wall two is a chemical reaction created by the growth rings to inhibit inward decay. Wall three is another chemical reaction established by what are called the medullary rays which immediately inhibits the lateral growth of decay. Because walls one, two and three are chemical reactions, we generally do not see them; but should they succeed, wall four begins developing, and when it does, it soon becomes highly visible. Wall four, the strongest boundary, is also designed to retard the spread of decay. Wall four only begins with the first flush of new growth and continues year after year until the wound is completely surrounded and closed with callous tissue.

Will Barry's trees survive? As one can see from the photo, the callous tissue is forming around the wound, but CODT has a long way to go. Still, only time will tell.