**DO TREES TALK TO EACH OTHER?**

Trees Matter III

Some people might think that we have spent too much time quarantined when we say that trees talk to each other, but the evidence is there. Trees absolutely do communicate according to a number of scientists around the world and do so by chemical and electrical signaling.

Trees communicate through hormones that act as messengers to direct cells' activities. A hormonal signal is transmitted from the root hairs of one tree into the adjacent fungal tendrils in the soil. In turn, the fungal mycelial tendrils carry the hormone signal to the root hairs of a neighboring tree, which then triggers a cellular response in the recipient tree.

*Tree roots interconnecting with their surroundings*

Trees send alarm and distress signals to warn neighboring trees about insect attacks, water stress and nutrient deficiencies. Dr. Suzanne Simard, an eminent forest scientist, is the leading force behind the research of tree communication. Much doubted at the beginning of her studies, Dr. Simard's revolutionary scientific findings are now well-respected.

Dr. Simard recently told NPR that: "*They're actually sending messages back and forth that balances the resource distribution among the community... [I]if one tree has a lot of water in it or a lot of nitrogen or has a high photosynthetic rate and if one tree is sick, then the neighboring tree shuttles more of those nutrients to that suffering tree... [I]f one tree gets damaged by, say, mountain pine beetles, the injured [tree] will up its defense enzymes. And then, a receiving tree will increase its defense enzymes because it "knows" now that there's some kind of damaging agent around."*

Another form of communication comes from release of aromatic compounds into the air from the leaves or blossoms of a tree. We are all familiar with the floral scents that blossoms release to attract insects and enhance pollination. These chemical signals are thought to be used for other purposes, such as alerting neighboring trees of an insect attack. Despite the chance that the signal will be swept away by wind, release of these compounds is effective in signaling to neighboring trees about insect attacks.

In the critically acclaimed book, *The Hidden Life of Trees,* Eric Wohlleben, a forest manager from Germany, recounts the case of the umbrella thorn acacia trees in the savannas of sub-Saharan Africa. When a giraffe begins eating an acacia's leaves, the tree emits a pulse of ethylene gas, which serves as a distress signal for surrounding acacias. Neighboring acacias then begin to accumulate increased amounts of tannins in their leaves, a relatively powerful herbicide that deters giraffe browsing. Remarkably, the giraffes seem to recognize this because they typically browse into the wind direction or alternatively move to a tree over 100 yards away, both strategies for defeating the release of a cloud of ethylene gas.

*Giraffe browsing on acacia thorn tree (Alamy Stock Photo)*

Wohlleben describes this interdependent community as the "wood-wide web." He says: *"All the trees here, and in every forest that is not too damaged, are connected to each other through underground fungal networks. Trees share water and nutrients through the networks, and also use them to communicate. They send distress signals about drought and disease, for example, or insect attacks, and other trees alter their behavior when they receive these messages."*

Are trees solo actors or are they communal in needing space to grow? Wohlleben states that they are definitely communal and points to the way that tree crowns spread widely to capture the maximum amount of sun. As the crown branches encounter those of a neighboring tree, the crown branches stop growing instead of invading the other's space. Rather than encroach, Wohlleben suggests that the trees find greater benefit from co-existence, for example by using the neighboring tree's crown for additional support when high wind conditions arise.

Some other scientists are not entirely convinced. For example, they question whether the chemical signals reflect an intention to warn neighbors. Instead, they suggest that other trees independently and randomly detect and react to the chemical signals. Whatever the answer, research continues on how and why trees talk to each other. Meanwhile, we are fortunate to live in a region with so many trees and forests. We now have the time to walk through the woods, observe the forest cover, study the undergrowth, and "listen" to the trees.

For further information:

Richard Grant's article in Smithsonian Magazine. https://www.smithsonianmag.com/science-nature/the-whispering-trees-180968084/

Eric Wohlleben, *The Hidden Life of Trees, What They Feel, How They Communicate: Discoveries from a Secret World* (William Collins 2016)

Dr. Suzanne Simard NPR Interview (2017). https://www.npr.org/transcripts/509350471

Dr. Suzanne Simard - TEDTalk and related information.
https://www.ted.com/speakers/suzanne_simard