

How do Trees Stay Safe and Healthy?





Threats to Trees

Trees must deal with a variety of threats including

- Attack from herbivorous (plant eating) insects and other animals
- Lack of sunlight or water
- Fungal and bacterial infection
- Threats from humans including logging, clearing for agriculture, industry etc.



Since trees are stuck in one position and can not escape what can they do to protect themselves?

The Tree Response



Photo: Scott Wylie via Flickr.com

Tree Defences

Although there is nothing trees can do to protect themselves from human activities, they are not helpless. They have several ways to defend themselves or adapt to threats. Some methods they carry out alone and others involve help. The main methods are:

- Physical barriers
- Chemical reactions
- Resource sharing



Physical Barriers

The first line of defense for trees are their physical barriers.

- The bark which surrounds them plays a similar role to our skin. It is a barrier to disease and insects.
- Thorns. Some species like Hawthorn have spiky thorns which make some animals think twice before eating them
- Waxy or spiny leaves. Some species have a hard, waxy covering which protect them.



Photo: Tristram Brelstaff via Flickr

Chemical Defences

If the physical barrier does not work or if there is a gap in the barrier, for example a cut in the bark, the next line of defense can be chemical.

- Some trees produce chemicals which are toxic to animals attempting to eat them.
- If a harmful bacteria or fungi enters through a gap in the tree's physical defenses the tree may produce chemicals to try to fight the infection.
- Other trees respond to an infection by causing the cells around the infected area to die. This stops the infection from spreading.
- Some trees can even produce chemicals that warn nearby trees of the attack or to summon help from predators of the pest!



Photo: Russell Street via Flickr

Chemicals and Communication

Trees living in forests can produce chemicals which send signals to other trees of the same species or sometimes even to animals when they are under threat. These chemicals can:

- Serve as a warning to other trees nearby who then start to activate their defences and start producing chemicals to ward off a potential attack.
- Attract animals who will feed on the insects which are eating the tree!
- Attract beneficial bacteria which can help fight off an infection.



Photo: Nicholas A. Tonelli via Flickr

Resource Sharing

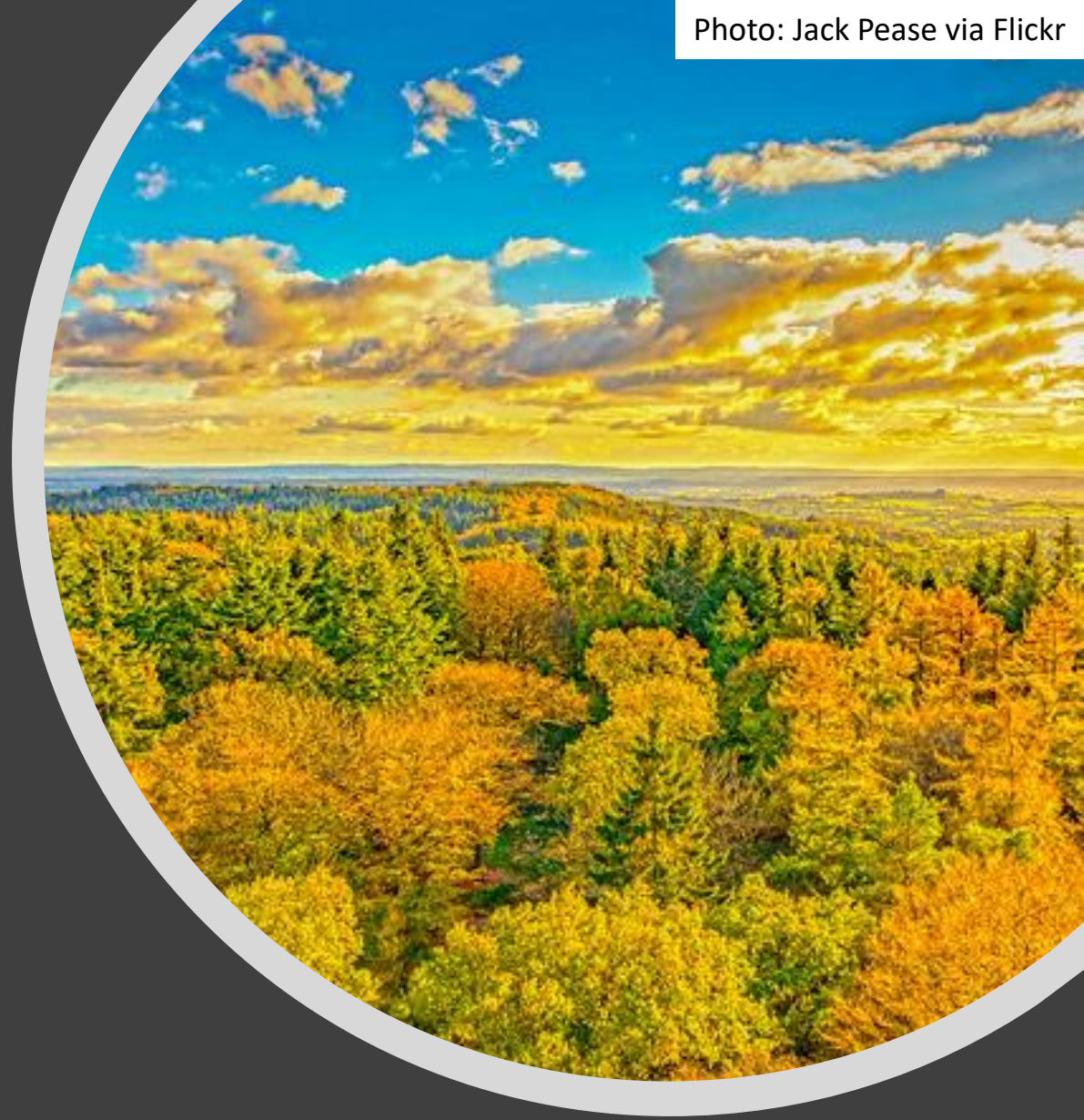
When there is a shortage of sunlight (which plants need for making food) or water this is a serious threat to a tree.

- Trees may share these resources with others near them through a network some people call the “wood wide web”.
- This is a huge collection of fungi which connect the roots of one tree to the next and the next.
- Sugars, water and signals can be shared between trees on this network and the fungi who are making this connection receive sugars from the trees they connect.

Why do trees help each other?

Two of the main methods of defense for trees rely on helping each other. Why would trees share resources or send warning signals?

- Resource sharing can occur when the “mother” or “hub” tree (one of the biggest and oldest in the forest) has more resources than it needs. This tree is often the tallest so it will receive more sunshine and therefore can make more food. These extra sugars can be passed to a young tree growing in the shade through the “wood wide network”. This is not being done intentionally or because trees are so friendly! A chain reaction of chemicals can just cause it to occur.
- Signaling other trees about threats may be an automatic reaction but it is helpful for trees to live in a healthy forest, so it benefits them to help their neighbours.
- Scientists do not have all the answers as we are only learning about tree communication.



Discover more about “The Wood Wide Web” going on below your feet!



Learn more about the ways that trees and other kinds of plants defend themselves





Photo: Peter Ichman via Flickr

If the videos won't play in
presentation...

- The amazing ways plants defend themselves:

<https://youtu.be/Hja0SLs2kus>

- How trees secretly talk to each other

<https://youtu.be/yWOqeyPIVRo>