

Why it is worth to observe tree phenology and understand when trees take up carbon.

Zuzana Lhotáková, Charles University in Prague, Faculty of Science Department of Experimental Plant Biology, Czech Republic

You may start the Phenology Campaign for the first time but you surely have seen trees changing during the year many times before. How do they grow from tiny seedlings to tall giants providing us shade in the summer? You can imagine trees need water and soil to grow. However, **there is an invisible and key substance in the air they need to build their body – the carbon. In the air you can find carbon as a gas – the carbon dioxide** – the same gas you exhale. The trees and all other plants use the carbon dioxide to build their leaves, stems and roots.

In a leaf the carbon can be stored for a growing season before the leaf is shed. Did you ever ask what happens with the leaves once they fall in the autumn? Leaf litter lie on the forest floor and bacteria, fungi (mashroom-like organisms) and earthworms decay (eat) it and release the carbon dioxide back to the air. It can last a year, two or even more before a leaf is converted back to the carbon dioxide. On the other hand, **the carbon stored in woody trunk of old oak can reside there for centuries** before a fallen trunk after oak's dead is converted back to the carbon dioxide. So, the carbon travels from the air to plant bodies, to the soil and the atmosphere again. We call this a carbon cycle.

The carbon dioxide in the atmosphere is not only the valuable food for trees but it acts as an invisible shield keeping the planet Earth warm enough to sustain life. Carbon dioxide in the air is like a glass of a greenhouse, therefore called a “greenhouse gas”. With too much carbon dioxide in the air our Earth “greenhouse” can get much warmer troubling us with too hot summers, storms and other unpredictable natural events. But trees help to keep the carbon dioxide in reasonable levels – they remove it from the air by their green leaves and lock the carbon in their body.

Do the trees take up carbon all year long? Some of them do – the evergreens – pines, spruces or holm oaks. **But the deciduous trees take up carbon only when they have green leaves, during the winter they sleep and breathe, releasing some amount of carbon dioxide as well.** That is why it is worth to observe and record tree phenology and understand when trees take up carbon helping us avoid overheating. **The scientists all over the world explore carbon cycle in forests, grasslands, and oceans and you can join them adding the Carbon Cycle activities to the Phenology Campaign.**