



TreeWatchWUR @TreeWatchWUR
My sap has started flowing, 141 minutes later than yesterday. @TreeWatchNet #WUR #Wageningen <https://tr.im/TWWUR>

TreeWatchWUR @TreeWatchWUR
My sap stopped flowing 39 minutes later than yesterday. #TreeWatch #WUR <http://tr.im/TWWUR>

TreeWatchWUR @TreeWatchWUR
Today I have transported 130.5 L, now it's time for my sap to stop flowing today. #TreeWatch #WUR <http://tr.im/TWWUR>

TreeWatchWUR @TreeWatchWUR
Today I have shrunk -0.08 mm, transported 178.1 L of water at a maximum sap flow of 14.8 L/h. <https://tr.im/TWOAK>

Tweeting about sap flow

A poplar on the Wageningen campus has about 4000 followers on Twitter. The 28-metre-tall tree tweets a few times a day with updates on its physiological condition.

TEXT ROELOF KLEIS PHOTO GEA HOGEVEEN

Good morning!, My sap has just started flowing.' This is the kind of tweet you can expect from the Canadian poplar growing in front of Orion on campus. Or perhaps the more than 30-year-old tree with its diameter of nearly a metre will tell you at the end of the day how many litres of water have evaporated from its foliage today (account: @TreeWatchWur). All this is made possible by sensors in the tree and technology for converting the data they collect into text messages.

Project leader Ute Sass-Klaassen of the Forest Ecology and Forest Management chair group is enthusiastic about the Twittering Tree, the latest publicity gimmick in her field – in the Netherlands at least. The tweeting tree was the brainchild of Belgian professor Kathy Steppe and her team at the University of Ghent. There is a beech, a maple and an oak tree in Belgium fitted out with the equipment. And in Germany there is a tweeting Scots pine.

The tweeting tree is an educational gadget, says Sass-Klaassen. The aim is to introduce a wider audience to Wageningen's tree research. 'We want to show people what goes on inside a tree. What is the impact of a warm, windy day like today on evaporation? At what time of year does a tree's growth accelerate, and how fast does it then grow? A lot goes on inside a tree.' The daily tweets keep interested members of the public abreast of developments. Already, about

4000 people are keeping in touch with what's going on inside the campus poplar.

SHRINKING AND SWELLING

Key sources of information are a sap flow meter and a dendrometer. The former measures the speed at which the tree transports water, while the latter measures changes in the tree's diameter. This not only changes over time through growth, but also in the course of 24 hours. The tree shrinks by day when a lot of water evaporates and its reserves run low, and it swells measurably by night when it absorbs water to replenish its reserves. To complete the measuring equipment, there is a climate station to provide data on atmospheric humidity and temperature, and a soil moisture sensor.

Do not imagine, however, that all this technology is just for show. 'Behind that gadget there is hard science,' says Sass-Klaassen. 'The measurements are used to describe the tree's physiological response to environmental factors. And the nice thing is that the tree documents these changing environmental factors. We all know about growth rings. The width of a growth ring tells us something about the general growing conditions for the tree. But we are going one step further and looking at the size of the cells within each growth ring too.'

The size and shape of the cells in each growth ring provide information about environmental factors during the growth period.

Smaller cells are formed in times of drought, for instance. Sass-Klaassen: 'So you can get information about the climate and the way trees respond to it from the size of the cells. Every tree is an archive. But first you have to find the key to deciphering that information.' The tweeting tree is an aid to finding that key, providing as it does a continuous flow of data about growth, moisture absorption and evaporation. Data which are fed into models which predict how trees will respond to climate change.

The tweeting poplar is just one of the trees being used for this research, says Sass-Klaassen. There are another hundred or so trees of various species being used in the Netherlands. But their contribution is anonymous and silent, without the aid of tweets. ■

www.wur.eu/twittertree

