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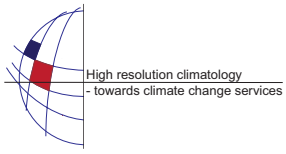

New possibilities in following the transport of water in living plants

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The aim of the study was to broaden the usage of the human diagnostic MR to study the plant-water connection. The measurements were carried out at Kaposvár University, Institute of Diagnostic Imaging and Radiation Oncology with MR of Siemens Avanto type.

The procedure is based on the interaction of the external magnetic field, electromagnetic waves and the hydrogen nucleus' in the substance. The MR measures the quantity and distribution of the protons. The most protons can be found in the water, where the hydrogen atoms are. As a conclusion, the MR doesn't measure the anatomical structure itself but the quantity and the distribution of the water inside. This is why this method is highly applicable for determining the plant-water connection.

Our test plant was the Phylleria angustifolia, an arboreal crop. The ascendant stem and six sub-stems (which formed three other branches) were examined. For each branch the measurements were preformed separately. Each plant was one years old, with a height of 30-35 cm, and was grown in peat soil. During the measurements the peat was saturated until it reached its full capacity. The recording was repeated six times in one sequence for the same plant.

The sequence used is a special "mixture" made from the human diagnostic method. The Phylleria in comparison to the human body is small, so we had to use the skull and body coils, to make the results visible. The skull coil ensured the perspicuity of the plant, while the body coil the perspicuity of the root.

Our results shown, that the actual water content of the stem is also determined by the existence of the branches and tissue formations. Analyzing the signal intensities of the stems the presence of water-obstacles formed by nodes were justified.

The accuracy of the MR system exceeds the margin error of the traditional plant-water investigation methods. The non-destructive method can be executed on living plants. So the MRI technique may be a new tool in the recognition of water transport of plants.