

## Can we grasp the ultrasonic language of living trees?

Lidewei L. VERGEYNST, Kathy STEPPE

Laboratory of Plant Ecology, Ghent University, Ghent, Belgium

Phone: +32 9 224 61 26, Fax: +32 9 244 44 10

e-mail: [Lidewei.Vergeynst@UGent.be](mailto:Lidewei.Vergeynst@UGent.be), [Kathy.Steppe@UGent.be](mailto:Kathy.Steppe@UGent.be)

### Abstract

Tree stems comprise the highway of water from the soil to the atmosphere in the hydrological cycle of forest ecosystems. Hydraulic conductance and capacitance of tree stems are the key features necessary to model the flow rate in this compartment, given a certain difference in water potential between roots and leaves. Often hydraulic characteristics are determined on excised branch segments, making the up scaling to whole tree stems somewhat dubious. The emptying of water conducting elements, called cavitation, directly affects the water pathway in the xylem and is closely related with its hydraulic properties. The sudden tension release during cavitation is accompanied by ultrasonic acoustic emissions (UAE). We will extensively investigate the waveforms of the UAEs in relationship with the occurring phenomena during the dehydration of living tree stems. Our goal is to retrieve information from in-situ detected UAEs to obtain a better quantification of hydraulic conductance and capacitance.