



Leaf and whole-tree water use relations of Australian rainforest species

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Climate change induces drought events and may therefore cause significant impact on tropical rainforests, where most plants are reliant on high water availability – potentially affecting the distribution, composition and abundance of plant species. Using an experimental approach, we are studying the effects of a simulated drought on lowland rainforest plants at the Daintree Rainforest Observatory (DRO), in tropical northern Australia. Before to build up the rainout infrastructure, we installed sap flow meters (HRM) on 62 rainforest trees. Eight tree species were selected with diverse ecological strategies including wood density values ranging from 0.34 to 0.88 g/cm³ and could be replicated within a 1ha plot: *Alstonia scholaris* (Apocynaceae), *Argyrodendron peralatum* (Malvaceae), *Elaeocarpus angustifolius* (Elaeocarpaceae), *Endiandra microneura* (Lauraceae), *Myristica globosa* (Myristicaceae), *Syzygium graveolens* (Myrtaceae), *Normanbya normanbyi* (Arecaceae), and *Castanospermum australe* (Fabaceae). Our preliminary results from sap flow data obtained from October 2013 to December of 2014 showed differences in the amount of water used by our trees varied in response to species, size and climate. For example *Syzygium graveolens* has used a maximum of 60 litres/day while *Argyrodendron peralatum* used 13 litres/day. Other potential causes for differential water-use between species and the implications of our research will be discussed. We will continue to monitor sap flow during the rainfall exclusion (2014 to 2016) to determine the effects of plant physiological traits on water use strategies.