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| Title | Shifting access to pools of shoot water sustains gas exchange and increases stem hydraulic safety during seasonal atmospheric drought. |
| Abstract | Understanding how plants acclimate to drought is crucial for predicting future vulnerability, yet seasonal acclimation of traits that improve drought tolerance in trees remains poorly resolved. We hypothesized that dry season acclimation of leaf and stem traits influencing shoot water storage and hydraulic capacitance would mitigate the drought-associated risks of reduced gas exchange and hydraulic failure in the mangrove Sonneratia alba. By late dry season, availability of stored water had shifted within leaves and between leaves and stems. While whole shoot capacitance remained stable, the symplastic fraction of leaf water increased 86%, leaf capacitance increased 104% and stem capacitance declined 80%. Despite declining plant water potentials, leaf and whole plant hydraulic conductance remained unchanged, and midday assimilation rates increased. Further, the available leaf water between the minimum water potential observed and that corresponding to 50% loss of stem conductance increased 111%. Shifting availability of pools of water, within and between organs, maintained leaf water available to buffer periods of increased photosynthesis and losses in stem hydraulic conductivity, mitigating risks of carbon depletion and hydraulic failure during atmospheric drought. Shifting access to tissue and organ water may have an important role in drought acclimation and avoidance. |
| Data author | Callum James Bryant, Australian National University  PhD Student |
| Research group leader | Marilyn C. Ball |
| Contents | 1 - Raw pressure-volume curve data.xlsx  2 - Summary of PV curved derived values for each leaf measured.xlsx  3 - Gmin calculation sheet for each leaf rep.xlsx  4 - Summary of gmin values per leaf rep.xlsx  5 - Shoot PV Curves raw and calculation sheet.xlsx  6 - Average shoot water release curves.xlsx  7 - Data for plotting mean shoot water release curves.xlsx  8 - Leaf RWC at stem P50 calculations.xlsx  9 - Instantaneous hydraulic capacitance calculations.xlsx  10 - Kestrel data hourly T and VPD averages by day to create seasonal averages.xlsx  11 - Diurnal gas exchange and hydraulic conductance.xlsx  12 - Pneumatic hydraulic vulnerability curves.xlsx  13 - Kleaf vulnerability curve RKM method.xlsx  Read me.docx |
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| Date | Collected in August 2018 (early dry season) and November 2018 (Late dry season) |
| Location | Branches and leaves were collected from a stand of *Sonneratia alba* trees growing naturally along the Daintree River, Daintree National Park, Far North Queensland (16°17'24.8"S 145°24'36.8"E). |
| Methods | See publication: Bryant C, Fuenzalida TF, Brothers N, Mencuccini M, Sack L, Binks O, Ball MC, 2021. Shifting access to pools of shoot water sustains gas exchange and increases stem hydraulic safety during seasonal atmospheric drought. Plant, Cell & Environment. |