Ecohydrology of CAM plants: environmental co-benefits for agroecosystems

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Photosynthesis and water use efficiency

For an analogy and description of the pathways, see Hartzell et al. (2018) PLOS ONE 13(6), e0198044.
Modeling the impact of water stress on C3, C4, and CAM

Photo3 model

Comparing C3, C4, and CAM in drydown

$$A_c = A_{\phi,c_m,T_l}(\phi, c_m, T_l) \times \hat{f}_{\psi_l}(\psi_l)$$

Calvin cycle carbon demand

Farquhar model

Water stress function

CAM productivity and water use in the field

Productivity: discrepancy between Photo3 and EPI models

Hartzell et al. (2020), submitted
Environmental co-benefits for agroecosystems

CAM crops perform consistently. Under low annual rainfall and/or high hydroclimatic variability they can...

• increase agricultural productivity and provide social benefits

• benefit soil nutrient levels and erosion control

• provide carbon sequestration in soils and biomass which surpasses that of traditional methods