

The poorly-explored stomatal response to temperature at constant evaporative demand

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Abstract

Changes in leaf temperature are known to drive stomatal responses, because the leaf-to-air water vapor gradient (Δw) increases with temperature if ambient vapor pressure is held constant, and stomata respond to changes in Δw . However, the direct response of stomata to temperature (DRST; the response when Δw is held constant by adjusting ambient humidity) has been examined far less extensively. Though the meager available data suggest the response is usually positive, results differ widely and defy broad generalization. As a result, little is known about the DRST. This review discusses the current state of knowledge about the DRST, including numerous hypothesized biophysical mechanisms, potential implications of the response for plant adaptation, and possible impacts of the DRST on plant-atmosphere carbon and water exchange in a changing climate.

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