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## Minisymposium 16: Water Relations

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Abs # 27004: [Effects of long-term exposure of stomata to high relative air humidity](#)

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Plants grown at high relative air humidity (RH) show poor control of water loss after transferring to low RH. This phenomenon is thought to be due to stomatal behavior. In this study we sought to elucidate whether there are differences between the stomatal anatomy and response characteristics of well-watered *Tradescantia virginiana* plants grown in climate rooms at moderate (55%) and high (90%) RH. The stomatal responses to treatments expected to cause stomatal closure [i.e. desiccation, abscisic acid (ABA) application and exposure to darkness] were studied using attached or detached young, fully expanded leaves. Stomatal size and density, leaf transpiration rate, stomatal conductance and stomatal aperture were measured. Stomatal closure and heterogeneity in response to desiccation was studied using a chlorophyll fluorescence imaging system under non-photorespiratory conditions. Besides larger stomata and lower stomatal density in high RH plants, there was also a striking difference in stomatal response characteristics between moderate and high RH plants. The stomata responded to desiccation, ABA and darkness in both moderate and high RH plants but to different extents. In high RH plants, transpiration rate, stomatal conductance and aperture were higher than in moderate RH plants. Stomatal aperture distribution histograms revealed that some partially or completely non-functional stomata were present amongst normal stomata in high RH plants. During desiccation different trends of stomatal heterogeneity were found in leaves grown at moderate and high RH. Following desiccation leaves grown at high RH had both a higher heterogeneity and a higher average value of PSII efficiency compared to leaves grown at moderate RH. This confirmed non-uniform closure of stomata and the presence of some partly or completely non-functional stomata in leaves grown at high RH. These non-functional stomata were distributed mostly around the main vein. **Key words:** Abscisic acid, chlorophyll fluorescence, desiccation, stomatal conductance, stomatal heterogeneity, *Tradescantia virginiana*

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