

**Title** Effect of (changes in) air humidity on transpiration and (adaptation of) stomatal closure of *Tradescantia* leaves during water stress

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### **Abstract**

This paper summarises our recent research on the physiological effects of prolonged high RH during growth on stomatal function and we discuss possibilities that arise from this work for reducing postharvest quality problems in cut flowers. Chlorophyll fluorescence imaging was used to measure stomatal closure in response to desiccation of *Tradescantia virginiana* leaves grown under high (90%) and moderate (55%) relative humidities, or transferred between these humidities. Stomata of plants transferred from moderate RH conditions to high RH showed the same diminished closure in response to desiccation, as did stomata that developed at high RH. This response was found both when the leaves were either fully expanded or still actively expanding during the moderate RH pre-treatment. However, when leaves were grown in high RH prior to a moderate RH treatment, the reduced stomatal closure response to desiccation was only reversed in leaves (regions) which were still actively expanding during moderate RH treatment. This indicates that with respect to stomatal responses to desiccation, high RH leaf regions have only a limited capacity to adapt after transfer to moderate RH conditions. It is suggested that the diminished stomatal closure in high RH-grown plants is the result of changes in the signalling pathway for ABA-related closure induced by a prolonged period (several days) at a low ABA level. A short increase of VPD (by decreasing RH or increasing temperature) once every 2 or 3 days is probably sufficient to overcome vase life problems of cut flowers grown at high RH. Testing the acclimation ability of stomata to desiccation by transferring high RH grown plants to low VPD for just a few days would be a simple and effective screening procedure for genotypes with more adaptable stomata.