Abstract:

Following their harvest, cut roses are generally stored dry prior to and during transport and only rewetted once they near the end of the chain. This treatment results in overall dehydration of the rose shoots and to the development of emboli within the xylem of the stems. A major consequence of this dehydration event will be stomatal closure as a result of the water stress that develops in the leaves. In addition to reducing water loss from the leaves, stomatal closure will also have major effects on leaf photosynthesis. Quantitative chlorophyll fluorescence imaging of leaves (or any other photosynthetic tissue) permits the visualisation of how efficiently light is being used to drive photosynthetic electron transport. Stomatal closure affects photosynthesis and thus photosynthetic electron transport. So, chlorophyll fluorescence imaging can be used to visualise the responses of leaves to the water stress imposed by cutting and the relief of water stress by rewetting. Results show that the degree of recovery of stomatal opening is generally only partial and that in addition to a persistent limitation of stomatal opening, there is an effect on photosynthetic electron transport due to processes acting at the level of the mesophyll. The results obtained illustrate the usefulness of chlorophyll fluorescence imaging to rapidly and effectively visualise and measure the effect of water stress on cut flowers and to quantify their recovery from this stress.