

Abstract:

Plants subjected to water stress are emitting ultrasound signals due to cavitations in their water conductive systems. As reported in the literature, these cavitation signals are used for quantifying water stress status of plants, analyses of water stress phenomena and also for practical applications in irrigation control. This paper deals with long time observations on cut roses during postharvest phase and analyses of cavitation profiles as a prognosis component for vase life.

Roses with good vase life potential often show four different phases in their cavitation profile. During the first phase, i.e. immediately after harvest and/or an adequate storage for up to 2-3 days, only few acoustic emissions are detectable. The second phase typically shows a high amount of signals and expressed light/dark rhythms. Decrease of intensity and frequency of emissions during day and increase of emissions during night is characteristic for phase 3 during which often wilting of petals, first leaf wilting and with susceptible cultivars also bent neck can be observed. Phase 4 marks the end of vase life, then often a strong increase of acoustic emissions is detectable, possibly caused by mechanical degradation of fibres and vessels and not by cavitations. Such profiles are probably of high interest for studying water relations of cut flowers and the influencing factors, but for the use as a prognosis component information results too late and due to a high variance is not reliable enough for practical applications.

In contrast to that, characterization of the endogenous water stress management (testing of stomata function at fluctuating light/dark phases and the refilling potential of vessels at short time de- and rehydration experiments) seems to have a better perspective for the application of cavitation profiles in prognosis of vase life.