Title NAA and STS effects on bract survival time, carbohydrate content, respiration rate and carbohydrate balance of potted *Bougainvillea spectabilis* Willd.

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Abstract

The aims of this work were to increase knowledge on the physiology of bract abscission in *Bougainvillea spectabilis* 'Killie Campbell' plants with regard to respiration and carbon balance. Using the effects induced by silver shiosulphate (STS) and/or naphthalene acetic acid (NAA, at high concentration: 500 mg L^{-1}) on bract abscission under interior conditions the relationship between bract survival time (longevity) and respiration rate or carbohydrate levels was investigated.

Treatments that included NAA significantly reduced bract abscission. Unexpectedly, the higher the levels of bract soluble and total carbohydrates, measured at day 10 postproduction (PP), the higher the abscission of bracts. These results show, for the first time, that abscission can be positively correlated with non-structural carbohydrate levels in the organ that abscises.

Bract respiration rate was significantly affected by treatment and PP day. Treatments that had higher bract respiration rates (WATER and STS) also had higher levels of non-structural carbohydrates in the bracts. Bract respiration rate decreased from day 10 to day 17 PP by approximately 50% (average of all treatments) and was negatively correlated with bract survival time.

In the carbon balance per gram of bract dry weight, the treatments WATER and STS, showed the largest decrease in the content of total carbohydrates and had the highest consumption of carbohydrates through respiration. These were the bracts therefore that needed to import a higher amount of carbohydrates per gram of bract dry weight. In the carbon balance for the total mass of bracts and adjacent stems in an average plant, the treatments WATER and STS showed the largest decreases in total carbohydrate during postproduction. However, contrary to the results per gram of bract dry weight, the highest total consumption of carbohydrates by respiration was obtained for the NAA and STS + NAA treatments. Thus bracts that last longer have lower individual carbon consumption while, at the plant level, the increased number of remaining bracts causes a higher overall expenditure.

Respiration rate has been used as an indicator of flower longevity and this correlation is here extended for the flower + bract system. Plants that had higher bract respiration rates, most probably, had a

higher flow of carbohydrates through the bracts (and flowers), which, in the end, was sensed as a higher carbohydrate level.