

Extending Postharvest Longevity of *Calathea zebrina*

A.K.C.H. Perera and J.W. Damunupola

Department of Botany, Faculty of Science, University of Peradeniya

Calathea zebrina (Sims) Lindl. (Family Marantaceae) is exported as cut foliage from Sri Lanka for its attractive zebra-like patterns on the leaf blade. Short vase life has been identified as a limitation during export. In order to extend the vase life (VL), several vase solutions were tested, that included different concentrations of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ (0.05 mM, 0.25 mM, 0.50 mM and 1.00 mM), different sucrose concentrations (0.5%, 1% and 2%), combination of the above sucrose concentrations with 0.05 mM $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and use of some household solutions (*viz.* cinnamon oil from the local market [1%, 2% and 5%], Sprite® [10% and 25%] and aspirin [0.0125% and 0.025%]). VL, relative fresh weight (RFW) and vase solution uptake rate (VSU) were measured. A plate count was carried out in order to assess the effectiveness of different $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ concentrations on bacterial growth. Turbidity of the vase solutions was measured using a UV spectrophotometer at 620 nm at days 0, 4 and 7 during the vase life. Possible causes for leaf spot of *C. zebrina* was investigated using Koch's postulate.

Based on VL, the effective treatments were 0.05 mM $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, mixture of 0.05 mM $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and 1% sucrose, 10% Sprite® and 0.025% aspirin. In all experiments, RFW showed significant differences in treatments when compared with the control, while VSU was variable. All tested $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ solutions significantly reduced ($p < 0.05$) the number of colony forming units of bacteria in the vase solutions, in comparison to the distilled water control. Turbidity of vase solutions showed significant reductions with 0.25 mM $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ and higher concentrations compared to the control. *Curvularia sp.* was identified as the causative agent of the leaf spot in *C. zebrina*.

Copper ions play multiple roles in inhibition of wound healing compounds (e.g., suberin and lignin), biocidal effect, ethylene synthesis/action inhibition etc. Sprite® may contain sugars, citric acid and carbon dioxide. Exogenously added sucrose contributes to, cell metabolism as an energy source, increases the osmotic value and enhances the ability of maintaining turgidity of tissues. Acidic solutions (pH 3.5 - 4.0) reduce vascular occlusion by inhibiting bacteria and facilitating water uptake and improve vase life. Though essential oils have antimicrobial properties, tested concentrations of cinnamon oil were phytotoxic. Extension of this research is necessary to develop a standard vase solution formula for *C. zebrina*.