

Preyaporn Leethiti 2014: Study on Water Relations and Xylem Occlusion in Cut *Dendrobium*, Lotus and Canna Flowers. Master of Science (Horticultural Science), Major Field: Horticultural Science, Department of Horticulture. Thesis Advisor: Assistant Professor Wachiraya Imsabai, Ph.D. 90 pages.

The variation in longevity of flower is associated with water uptake and water loss of *Dendrobium* 'Khao Sanan' orchid, lotus (*Nelumbo nucifera* Gaertn., cv. Saddhabutra) and canna (*Canna indica* L.) flowers. The result showed that the average vase life of orchid, lotus and canna flowers were 19, 5 and 3 days, respectively. The rate of water uptake and water loss of lotus flowers was higher than those in orchid and canna flowers. Moreover, the change of water balance to minus value was detected in canna flowers faster than those in orchid and lotus flowers. Stem end blockage may be the cause of reduced water uptake. The result showed that water uptake of these flowers which their stems whether cut in the air, cut under, water or cut and left in the air for 1 hour before holding in distilled water was not significantly different among treatments. This result indicated that air embolism may not be the cause of vascular occlusion in these flowers. The rate of water uptake of orchid flowers held in 8-hydroxyquinoline sulfate (HQS; 200 mg/L) or dichloroisocyanuric acid (DICA; 25 and 50 mg/L) solution was higher than those held in distilled water while the rate of water uptake and vase life of lotus and canna flowers were not different from those held in distilled water. Holding these flowers in different solutions: S-carvone (0.032-0.636 mM), tropolone (0.25 and 0.5 mM), 4-hexylresorcinol (4-400 μ M) and amitrole (1-10 mM) showed that water uptake and vase life were not different from those held in distilled water but the vase life of orchid flowers held in 4-hexylresorcinol and amitrole were longer than those held in distilled water. The anatomical study of xylem showed that partial occlusions caused by pectin, lignin and carbohydrates occurred only at the basal portion of stems of orchid flower held in HQS, DICA, 4-hexylresorcinol and amitrole solutions. In contrast, xylem occlusions by pectin, lignin, carbohydrates and phenolic compounds were observed in orchid flower stems held in distilled water at the basal portion and at the upper and lower positions of holding solution level. Based on this study, it can be concluded that microorganism, phenolic compounds and lignin may be the cause of xylem occlusion in cut *Dendrobium* flowers while the latex or mucilage may be the cause of xylem occlusion in cut lotus and canna flowers, respectively.

Student's signature

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