

Vimolchat Sarntinoranont 2010: Cause and Control of Flower Bud Yellowing in *Dendrobium* Sonia 'Ear-Sakul'. Doctor of Philosophy (Horticulture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Associate Professor Surawit Wannakrairoj, Ph.D. 200 pages.

The flower bud yellowing of *Dendrobium* Sonia 'Ear-Sakul' under 50 % shaded in a commercial nursery was monitored for a year. The most sensitive stage was found to be the ready-to-bloom flower buds. The percentage of inflorescence with flower bud yellowing in winter was the highest of the year. The inflorescence had more bud yellowing with the increase in the number of flower bud per inflorescence or per pseudobulb, the decrease in the number of open flowers per inflorescence or per pseudobulb, or the decrease in the number of yellowed flower bud were lower on inflorescence. In summer, 2 environmental parameters from 3 days before flower bud yellowing affected the yellowing. The percentage of inflorescence with yellowed flower bud was found to be correlated with average nighttime rainfall and cumulative hours of daytime with temperature higher than 30 °C. The R^2 of the regression equation was 0.895. In rainy season, 4 environmental conditions from 3 days before flower bud yellowing affected the yellowing. The percentage of inflorescence with yellowed flower bud was found to be correlated with 1) cumulative hours of daytime with $0 \mu\text{mol m}^{-2} \text{s}^{-1}$ light intensity, 2) average rainfall during 10.00 AM-14.00 PM, 3) cumulative hours of daytime with temperature less than 25 °C and 4) cumulative hours of moisture content between 75-90 %. The R^2 of the regression equation was 0.613. The critical environment had no effect on sucrose and glucose contents of the 1st and the 2nd bud of the inflorescences, as well as the calcium and boron contents in inflorescence and leaf. However, the fructose content decreased in the 2nd bud of inflorescence in the forth day. In winter, 4 environmental parameters from 3 and 5 days before flower bud yellowing affected the yellowing. The percentage of inflorescence with yellowed flower bud was found to be correlated with 1) cumulative hours of daytime temperature higher than 30 °C for 5 days before flower bud yellowing, 2) cumulative hours of nighttime with moisture content between 75-90 % for 3 days before flower bud yellowing, 3) cumulative hours with higher than 40 % diurnal relative humidity for 5 days before flower bud yellowing and 4) average nighttime temperature for 3 days before flower bud yellowing. The R^2 of the regression equation was 0.514. The critical environment had no effect on sucrose, glucose and fructose contents of the 1st and the 2nd bud of inflorescence, as well as calcium and boron contents in inflorescence and leaf. Under the critical environment of rainy season in a growth chamber, the spraying of 0.5 % glucose resulted in no flower bud yellowing even after transfer to control environment. In winter, the spraying of 0.5 % fructose could increase sucrose content in the bud after 3 days. Whilst it could increase the fructose content in the bud after 5 days. However, it had no statistical effect on the bud yellowing.

Student's signature

Thesis Advisor's signature