

Sittisak Nukoolkit 2014: Photoperiod on Growth, Flowering, Dormancy and Rhizome Quality of *Globba williamsiana* M.F. Newman. Master of Science (Horticulture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Assistant Professor Patchareeya Boonkorkaew, Ph.D. 127 pages.

In order to clarify the effect of day length on growth, flowering, dormancy and rhizome quality of *Globba williamsiana* M.F. Newman 'Giant Violet Dancing Girl' was conducted at Department of Horticulture, Faculty of Agriculture, Kasetsart University, Bangkok during January 2012 to September 2013. The experiments were carried out during in-season and off-season. The day length was approximately 13 hours natural day length in-season and 11 hours natural day length in off-season. Reduction of day length from 13 to 8 hours in-season was using the black curtain covering, while increasing of day length from 11 to 15.5 hours in off-season was using incandescent lamps (INC) with $50 \mu\text{mol m}^{-2} \text{s}^{-1}$ light intensity from 17:00 to 22:00. The experimental design was 2x2 factorials in CRD with 5 replications. As a result, this plant clearly responses to day length which affected the diurnal net photosynthetic rate and dormancy, i.e. plant growth, flowering and rhizome yield showed very low values, including dormancy occurred when the plants were growing under 8 and 11 hours a day. On the other hand, the plants were growing under 13 and 15.5 hours a day showed high values of plant growth, flowering and rhizome yield, including dormancy did not occur. Furthermore, lamp type and light intensity of light supplement in off-season were studied using incandescent lamp (INC) and compact fluorescent lamp (CFL) with 5 and $50 \mu\text{mol m}^{-2} \text{s}^{-1}$ light intensity from 17:00 to 22:00 (15.5 hours a day) which were compared with control (no light supplement, 11 hours a day). The results showed that both INC and CFL lamps with both of two light intensity levels can be increased the net photosynthetic rate, plant growth, flowering and rhizome yield without dormancy. Lastly, the cost and value of supplemental lighting was compared. As a result can be concluded that using CFL with light intensity of $5 \mu\text{mol m}^{-2} \text{s}^{-1}$ is sufficient for increasing of plant growth, flowering, and rhizome yield of globba when they are growing during off-season. This kind of lamp can be saved more the energy than INC up to 80% and had longer life span about 8 times. Therefore, the off-season production of globba can be used supplemental lighting technique. The growers should set up 24 watt CFL 1 bulb per m^2 about 1.2 m above globba canopy which is approximately $5 \mu\text{mol m}^{-2} \text{s}^{-1}$ light intensity and opened from 17:00 to 22:00 between October and February.

Student's signature

Thesis Advisor's signature