

Therachot Hesawad 2014: Study on Diurnal CO₂ Exchange in Some Commercial Bromeliads under Greenhouse and Indoor Conditions. Master of Science (Horticulture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Assistant Professor Patchareeya Boonkorkaew, Ph.D. 114 pages.

The study on diurnal CO₂ exchange in some commercial bromeliads under indoor and greenhouse was conducted at Department of Horticulture, Faculty of Agriculture, Kasetsart University, Bangkok during August 2012 to July 2013. There were three experiments. Exp 1: study on diurnal CO₂ exchange patterns of bromeliads, the result showed that the values of CO₂ exchange rate (CER), stomatal conductance and transpiration rate of 8 bromeliad cultivars can be divided into two groups; C₃ and CAM. C₃ plant had positive CER values during day time that consisted of 1) *Alcantarea imperialis* 2) *Guzmania* 'Hilda' and 3) *Vriesea splendens*. The highest of CER was found in *Alcantarea imperialis* with 2.73 μmol m⁻²s⁻¹ at 10:00 am. In the other hand, CAM plant had positive CER values during night time (06:00 pm – 06:00 am), that consisted of 1) *Aechmea fasciata* 2) *Billbergia pyramidalis* 3) *Cryptanthus* 'Pink Star' 4) *Neoregelia* 'Fireball' and 5) *Tillandsia xerographica*. The highest of CER was found in *Aechmea fasciata* with 3.00 μmol m⁻²s⁻¹ at 10:00 pm. Unfortunately, type and number of stomata cannot be used to classify the photosynthetic pathway of bromeliads. Exp. 2: effect of temperature on diurnal CER of bromeliads was studied. The photosynthetic parameters of 3 commercial bromeliad cultivars, including *Aechmea fasciata* and *Neoregelia* 'Fireball' (CAM plant), and *Vriesea splendens* (C₃ plant) were compared among three different in day and night temperatures, i.e. 34/31°C (greenhouse), 25/31°C and 25/25°C. All cultivars that were placed in both 25/31°C and 25/25°C showed CER patterns differed from the usual (greenhouse), i.e. CAM plant had positive CER values in day time, while C₃ plant occurred in night time. Lastly, exp. 3: study on CER and pigments content of bromeliads leaf was conducted under greenhouse and office room. The result showed that 4 color various leaf cultivars of *Neoregelia* can be decorated in office room with light intensity from fluorescent, 28/31°C (day and night temperature), 45% relative humidity, and 1,680 ppm CO₂ concentration. In this room condition, they had higher CER efficiency than in greenhouse and also had display life at least 30 days. The highest of CER efficiency was found in *Neoregelia* 'Tiger Cub' (green leaf with red horizontal stripes). While, *Neoregelia* 'Zoe' (red leaf with pink vertical stripes), *Neoregelia* 'Fireball' (red leaf) and *Neoregelia* 'Donger' (green – pink leaf with white edge) had high CER efficiency, respectively.

Student's signature

Thesis Advisor's signature