

Choeratphatchra Khieowichai 2014: Green Roof: Plant Species, Substrate and Effect on Room Temperature and Relative Humidity. Master of Science (Horticultural Science), Major Field: Horticultural Science, Department of Horticulture. Thesis Advisor: Piyanath Pagamas, Ph.D. 115 pages.

The objective of this study was to select the suitable plant species and substrates for green roof planting and effect on room temperature and relative humidity. Selected plant species, *Cuphea hyssopifolia*, *Tradescantia spathacea*, *Chlorophytum bichetti*, *Alternanthera bettzickiana*, *Sansevieria trifasciata*, *Duranta erecta*, *Aloe vera*, and *Bryophyllum delagoense* were grown in a container using soil as a growing substrate at 10 centimeters deep in full sun and watered once a day for three months. The results showed that *Duranta erecta* had the highest relative growth rate, followed by *Chlorophytum bichetti*, *Cuphea hyssopifolia*, *Aloe vera*, and *Bryophyllum delagoense* respectively. Then, they were grown in different substrates: coir dust, coconut husk chips, rice ash charcoals, and a mixture of coir dust, coconut husk chips, and rice ash charcoals (1:1:1) at 10 centimeters deep and watered twice a week for five months on the rooftop. The results showed that, *Cuphea hyssopifolia*, *Aloe vera*, and *Bryophyllum delagoense* grown in any substrates had an increasing of the average growth index and plant covered area, with the highest values found in these grown in coconut husk chips. Then established green roof by using *Cuphea hyssopifolia*, *Aloe vera*, and *Bryophyllum delagoense* and coconut husk chips as plant materials. The temperature and relative humidity in green roof room and non-green roof room of 1.8×3×3 metres at ceiling, middle and floor level were recorded for 8 months. The result showed that in each level inside the green roof room had lower temperature and higher relative humidity than the non-green roof room in every season. In conclusion, *Cuphea hyssopifolia*, *Aloe vera*, and *Bryophyllum delagoense* were suitable for green roof planting using coconut husk chips as a substrate. Green roof garden decreased the room temperature and made the comfortable relative humidity level. Moreover, green roof garden reduced the cooling load of air conditioner for 73.81 percentage comparing with the non-green roof room.

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Thesis Advisor's signature