

Pongphan Siripornpukdeekul 2010: Study on Stem CO<sub>2</sub> Exchange Rates of Tapped and Untapped Rubber Trees. Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Poonpipope Kasemsap, Ph.D. 78 pages.

Carbon dioxide exchange rates of tapped and untapped rubber trees were studied at different positions on main stems. Treatments in this study included (A) untapped trees, (B) tapped trees without stimulation, and (C) tapped trees with ethylene stimulation. The automated, open system of gas exchange apparatus with 24 chambers were developed and then tested. It was found that the developed system worked well. The air flow rates of all chambers were uniformed and adjustable as needed. It was relatively easy to maintain differences in carbon dioxide concentration between reference and sample airs of all chambers to be within the limit required by infrared gas analyzer. The results showed that stem carbon dioxide exchange rates varied with season and growth stages of rubber trees. Stem carbon dioxide exchange rates was greatest during October to beginning of November, before leaf shedding began. It decreased during the dry season, when rubber trees shed leaves. Tapped trees had significantly greater stem carbon dioxide exchange rates than untapped trees while tapped trees without stimulation had greater stem carbon dioxide exchange rates than tapped trees with ethylene stimulation. The difference among carbon dioxide exchange rates of various stem positions were found in 9 out of 14 sub-experiments. Daily averaged air temperature did not correlated to daily averaged stem carbon dioxide exchange rates during the entire experimental period. However, stem carbon dioxide exchange rates was highly correlated to air temperature within the same day.

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