

Sumit Kunjet 2013: Plant Water Status in Response to Climate Change and Tapping Activity of Mature Rubber (*Hevea brasiliensis* Muell.Arg.). Doctor of Philosophy (Tropical Agriculture), Major Field: Tropical Agriculture, Faculty of Agriculture. Thesis Advisor: Associate Professor Poonpipope Kasemsap, Ph.D. 105 pages.

The variations of water status in response to climatic conditions and tapping activity of mature rubber trees clone RRIM 600 were investigated in the non-traditional planting area at Chachaengsao Rubber Research Center (CRRC) from January 2007 to January 2010. Sap flow was measured by heat dissipation method adapted from Granier (1985, 1987) using home-made radial probes which was developed by Roupsard *et al.* (2006) and then calibrated with the cut stems of rubber tree in the laboratory. Radial, axial and azimuthal variabilities of sap flow were evaluated using four to eight sets of probes. Radial variabilities were modeled to be functions of depth into the xylem. Seasonal dynamics of sap flow of 7 trees, ranging in sizes from 55 cm to 100 cm girth, were monitored using probes installed at north and south directions. Stand transpirations were estimated from sap flux density.

The results showed that stomatal conductance was more sensitive to climatic variations than stand transpiration. There was time lags between diurnal peaks of stomatal conductance and stand transpiration. In addition, the relationship between climatic factors and transpiration varied along the year. In general, seasonal variations of stand transpiration was related to LAI, VPD, and soil water content while diurnal variations of stand transpiration and stomatal conductance were related to VPD and net radiation. Finally, leaf water potential (ψ_{predawn} , ψ_{midday}), whole tree hydraulic conductance (gL) and percentage of loss of hydraulic conductivity (PLC) were not affected by tapping. This implied that tapping activity would not significantly change water balance of rubber trees. However, tapping activity reduced sap flux density and stomatal conductance in the dry season, particularly in the tapping day.

Student's signature

Thesis Advisor's signature

____/____/____