Pisamai Chantuma 2007: Dynamics of Carbohydrate Reserves as Related to Tapping in Rubber Tree. Doctor of Philosophy (Botany), Major Field: Botany, Department of Botany. Thesis Advisor: Assistant Professor Sornprach Thanisawanyangkura, Dr.Sci. 104 pages.

This study assessed the impact of tapping, including Double Cut Alternative system (DCA) on trunk physiology of rubber tree. Carbohydrate dynamics in wood and bark as well as latex metabolism were investigated on a trunk scale. Results confirmed that DCA improved yield per tree as compared to ½ S d/2 control. DCA increased latex metabolic activity too. For all treatments, vertical latex sucrose in latex was lower around the tapping cut, but higher on the uppermost parts, whereas latex Pi decreased bottom-up along the trunk. In trunk wood, starch accumulated along the vegetative season and dropped after re-foliation, whereas SS changed in an opposite way. However, TNC was higher in tapped treatment than in the untapped control. Thereby, the additional demand created by regeneration of latex did not deplete, but on the contrary increased wood reserves. This indicated that reserve sink is not a mere buffer, but a competitive sink receiving carbon in parallel to other sinks. Moreover, latex sink size/activity depended on tapping system. DCA not only increased carbon pool in trunk but also enlarged the trunk area involved in latex regeneration. Carbohydrate dynamics along 2 years showed that wood was the long term reserve compartment, which was the more variable. Starch in wood was the main reserve pool, whereas SS was more a transport form. Bark was the short to medium term compartment, varying less. Starch in bark was a local buffer and SS was the ready-to-use component. In addition, as a first step to assess the role of enzymes involved in carbohydrate metabolism, we adapted protocols for studying amylase, cell wall invertase and sucrose phosphate synthase activities in rubber wood and bark.

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