

Prasit Somjinda 2014: The Effect of Heat Accumulation Unit and Amount of Water on the Brix of Sugarcane var. Suphanburi 80. Master of Science (Soil Science and Management Technology), Major Field: Soil Science and Management Technology, Department of Soil Science. Thesis Advisor: Associate Professor Kumut Sangkhasila, Ph.D. 78 pages.

Effect of heat accumulation unit and amount of water on the longitudinal distribution of brix for sugarcane var. Suphanburi 80 was the content on this study. Sugarcane was planted in a cement tank with a diameter of 100 cm, treated as an experimental unit. The experimental design was 2x4 factorial in CRD with 3 replications. The first factor was 2 levels of heat unit. The second factor was 4 levels of supplementary water. The heat unit treatments were made by 1) growing sugarcane in tanks under normal field conditions (T1), and 2) growing sugarcane in a tanks surrounded with plastic sheets (T2) intending to increase the air temperature inside the sugarcane canopy. Supplementary water treatments were rainfed conditions with 1) no addition water supplemented (W0), 2) with supplemented water during 154-184 and 215-245 day after growing, DAG, (W1) 3) with supplemented water during 123-245 DAG (W2) and 4) with supplemented of water during 93-366 DAG (W3). Amount of additional water was defined to be 4.0, 4.5, 5.0 and 4.0 mm per day when the age of sugarcane were 0-30, 31-170, 171-295 and 295-330 DAG.

Results heat accumulation units at harvested time (375 DAG) were 3,513 and 3,695 °Cd for the 2 heat accumulation, respectively. The total amount of water received by the treated sugarcane for W0, W1, W2 and W3 were 1,508, 1,535, 1,615 and 2,137 mm, respectively. The T1 made the stem diameter of sugarcane bigger than that of the T2 (p-value = 0.001). Stem mass accumulation, number of internodes, stem length and accumulative leaf areas at harvested time were not statistically significant differences for the heat unit treatments. There were no any interaction between heat accumulation unit and amount of water on brix value of sugarcane. At 124, 164, 198, 222, 270, 305 and 354 DAG, T1 made average values of brix been higher than those of T2 (p-value = < 0.023). At 270 and 305 DAG, water treatments W3, W2 and W1 made brix values been higher than those of W0 (p-value = < 0.006). The application of equations describing relationships between heat accumulation units and brix values of sugarcane showed that T1 gave the highest brix value of 19.46 °Bx when the sugarcane was at the age of 286 days with its corresponding heat accumulation unit of 2,896 °Cd, While T2 gave highest brix value of 17.05 °Bx when the cane was at the age of 321 days with its corresponding heat accumulation unit of 3,176 °Cd. Treatment T2 tended to delay its harvesting time for 35 days. Treatment W0, W1, W2 and W3 had their highest stem brix value when their ages were age 302, 295, 298 and 299 days, respectively. It should be concluded that an additional amount of water to sugarcane made their harvesting times been earlier than sugarcane without an additional water.

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Thesis Advisor's signature