

Winai Ut-khao 2010: Transpiration Rate and Surface Characteristics of Shaded and Non-shaded Mangosteen (*Garcinia mangostana* L.) Fruits. Master of Science (Botany), Major Field: Botany, Department of Botany. Thesis Advisor: Associate Professor Kanapol Jutamane, D.Agr. 86 pages.

Translucent flesh disorder (TFD) and gamboge disorder (GD) are the physiological disorders relate to the water flow in mangosteen fruits and impact to the quality of mangosteen fruits for exporting. The objective of this experiment was to examine the water flow out mechanism from the fruit surface of shaded (S) and non-shaded (NS) mangosteen (*Garcinia mangostana* L.) fruits during fruit ontogeny, and to determine mechanism and relation of TFD and GD by measured the fruit transpiration rate that expressed the rate of water flow out from the fruits, studied the stomatal characteristics that expressed the conductance of the water flow out from fruit surface during fruit ontogeny and compared percentage of TFD and GD between S and NS mangosteen fruits from 20-year-old trees. The result showed that transpiration rate per unit of fruit surface area decreased following the decrease of total fruit surface conductance to water vapor diffusion (g_s) during the increase of fruit age. During fruit ontogeny, NS fruits had transpiration rate per fruit higher than S fruits. During 2 to 6 weeks after fruit set, fruit transpiration rate limited by the fruit to air vapor pressure deficit ($VPD_{fruit-air}$). NS fruits had transpiration rate higher than S fruits during this stage because the climate around the NS fruit surface was drier (high light intensity and air vapor pressure deficit) than S fruits. During 7 weeks after fruit set to the harvest stage (13 weeks after fruit set), fruit transpiration limited by g_s , especially during 10 to 13 weeks after fruit set that the fruits had very low transpiration rate and g_s , so the rate of water flow out from the fruit was low. The study of the stomatal characteristics showed the mangosteen fruits had paracytic stomata and exhibited 3×10^6 to 3.1×10^6 stomata per fruit. The stomatal frequency decreased with surface expansion during fruit ontogeny. NS fruits had stomatal frequency, perimeter and width of stomatal pore higher than S fruits during fruit ontogeny, but the guard cell dimensions had no difference between S and NS fruits. The compare of percentage of TFD and GD in the fruits showed S fruit had percentage of GD higher than NS fruits, but percentage of TFD had no difference between S and NS fruits. The result indicated NS fruits had fruit surface conductance and the rate of water flow out from fruit surface higher than S fruits which affecting to NS fruits had TFD and GD lower than S fruits.

Student's signature

Thesis Advisor's signature