Transpiration Estimation of Banana (Musa sp.) Plants with the Thermal Dissipation Method

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The banana (Musa sp.) plant is one of the largest monocotyledoneous terrestrial herbaceous plants in the world. The measurement of transpiration (Tr) for a whole banana plant is always difficult to perform due to its size. However, the sap flow (SF) of the plant has been successfully measured by using the thermal dissipation probe (TDP) or â˜€Granierâ ™€ method in the corm of the banana plant (Lu et al. J Exp Bot 53:1771â .(2002 ,1779”€The present study aimed to validate their method using a sizable number of banana plants in a greenhouse in Israel. The SF data was compared to the gravimetric measurement of transpiration. The lag time of SF behind Tr was also analyzed. Results showed that the daily SF agreed with the daily Tr when the effective radius for sap flow in the corm was taken as 0.63 R, where R is the radius of the corm. The SF lagged 45 min behind the Tr from 0630 to 1040 hours. Whereas the Tr was not statistically (P>0.05) different from the SF between 1330 and 1700 hours. The reduction in water capacity of banana plant due to SF lag was about 10.5% of the daily Tr, and it recovered gradually in the afternoon. Using more plants can reduce the measurement error of the TDP method. The measured daily SF can be considered as an accurate estimation of the daily Tr for banana plant.