

Characterization of rice (*Oryza sativa*) evapotranspiration using micro paddy lysimeter and class "A" pan in Tropical environments.

ABSTRACT

The relationship between the measured evapotranspiration (ET_m) and evaporation from Class "A" pan (E_p) was determined in irrigated rice field in tropical Malaysia. Evapotranspiration was measured using Marriott tube type micro-paddy lysimeter (MPL) installed in ponded rice fields and the pan evaporation data was obtained using the class "A" pan. The maximum values of E_p and ET_m from the study site were 6.0 and 7.3 mm/day, while the maximum estimated ET value was 5.0 mm/day. The measured (ET_m) and calculated (E_p) were compared to determine the goodness of fit (R²). The study showed that the ET rate of rice increases consistently up to the heading stage and then is declined at the ripening stage. A good simple linear model relationship between the ET_m and estimated evapotranspiration was also observed. From the model relationships, values of coefficient of determination R² obtained are 0.69, 0.73, 0.90 and 0.50 for vegetative, panicle, reproductive and ripening periods, respectively. Mean pan-crop coefficients (K_pK_c) of 1.1 and 1.2 were obtained from the ratio of measured crop evapotranspiration (ET_m) and measured pan evaporation (E_p). Evapotranspiration rates from the study area were in the range of values obtained for the major areas of rice production in Asia. Generally, evapotranspiration is affected by management and natural factors. These factors may influence crop growth and thereby, amount of water use. It may vary between different farms, season and days. The rate of water use is slow at young stage (evaporation) and it increases with crop growth (due to high transpiration). The rate reaches peak during some part of the growth period, then tapers off by harvest time.

Keyword: Crop coefficients; Evapotranspiration; Growth stages; Micro-paddy lysimeter; Water requirements