

Analysis of Soil Evaporation Under Surface and Subsurface Drip Irrigation

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Summary

The experiment was carried out at the Okinawa Subtropical Station (OSS), Japan International Research Center for Agricultural Sciences (JIRCAS). This report contains the information provided by the author who worked as a JSPS fellow for 30 days during August – September, 2003 with the host researchers of JIRCAS-OSS. Soil evaporation was analyzed under the surface and subsurface drip irrigation using the newly installed lysimeters in the Island Environment Management Laboratory. Surface and subsurface drip irrigation was given twice a day (morning and evening) in four weighing lysimeters. Soil evaporation was investigated by taking data from the weighing lysimeters and the moisture content of the soil determined by gravimetric method (Picture 4). Soil evaporation was affected greatly by the soil surface moisture. Therefore, the dependence of the Evaporation (Es)/Evapotranspiration (Eto) ratio on the soil surface moisture was examined under different irrigation methods and irrigation time. Results showed that irrespective of irrigation time, soil evaporation decreases under surface irrigation while under subsurface irrigation showed reverse trend that is soil evaporation increases with the increase of soil surface moisture. The dependence of Es/Eto on soil surface moisture under the four conditions clearly revealed that during morning irrigation – Es is greater under surface than the subsurface irrigation. During the evening irrigation, Es is higher under the subsurface than the surface irrigation.

Present research was conducted within very short period but two typhoon – Typhoon No. 13 and Typhoon No. 14 seriously affected the research work. Further studies are suggested in the areas of – soil evaporation under different irrigation methods and time, effect of soil moisture availability or irrigation point on the soil evaporation under different agronomic practices with or without crop, interaction effect of soil moisture availability, irrigation methods and time, on the soil-air-oxygen dynamics and its relationships with the Es.

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