ABSTRACT

Master of Science-M.Sc.

FIELD EVALUATION OF PERFORMANCES OF DRIP IRRIGATION SYSTEMS IN THE BÜYÜK MENDERES RIVER BASIN

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In this study, eighteen drip irrigation systems under field operation located in the Büyük Menderes river basin were chosen for performance evaluation. Besides these systems, the study included a survey study for thirty drip irrigation systems to demonstrate main problems of the systems. The performance evaluation was carried out by using procedures explained in American Society of Agricultural Engineering Practices 458 (ASA EP458). Following these procedures, discharge and pressure data were collected from the chosen eighteen drip irrigation systems. To take measurements of emitter discharges and pressures, four lateral lines on a sub main unit (manifold) were determined: on at the inlet, one at the one-third, one at the two-third and one at the end positions. Five points were tested on each lateral: one at the inlet, one at the one-third, one at the middle, one at the two-third and one at the end. This gave a total of 20 measurement positions. Using these measured data, statistical uniformity (U_s), hydraulic uniformity (U_{sh}) and emitter performance variation (U_{pf}) parameters were computed for drip irrigation systems evaluation. Statistical uniformities for drip irrigation systems were ranged between 75% and 90%. These values were settled the systems within good and fair classes. Hydraulic uniformity values were over 90% for all drip irrigation systems except the ones located in farms 15 and 17. The drip irrigation system with a 90% of hydraulic uniformity value was classified as a very good level. Emitter performance variation values for all farms were ranged between 80% and 90%. Based on emitter clogging, water quality and emitter manufacturer's variation coefficient, drip irrigation systems were categorized in poor and fair classes. These results obtained from the performance evaluation were supported by the results from the survey studies. Drip irrigation systems in the chosen farms provided good performance results for hydraulic and statistical uniformities. However, emitter wear and plugging, inconsistent repair and maintenance, and higher emitter manufacturer's coefficient of variation problems are the main problems of lower performance of the systems.

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