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# Effect of Weather Conditions, Operating Pressure and Riser height on Performance of Sprinkler Irrigation System

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**Abstract**

This study was conducted during February and May 2016 at the Demonstration Farm of the Faculty of Agriculture, University of Khartoum at Shambat(Longitude 32° 32َ E, Latitude 15° 40َ N and Altitude 380 m amsl), on a total area of 40 m × 30 m , with the objective of determining water distribution efficiency due to the effect of different weather conditions during three periods in the day (morning 08:00–0 9:00 a. m., midday 12:00–02:00 p. m., evening). The study also included determination of Christiansen's coefficient of uniformity (CU%) and the distribution uniformity (DU%) for each of the above mentioned periods under two operating pressures of 1.0 and 2.0 bar and two riser heights of 1.0 and 1.5 m. Plastic sprinkler heads (LEGO) sing1e nozzle type were used .The experiment consisted of testing the effect of wind, evaporation and drift losses on water distribution uniformity (Christiansen's coefficient of uniformity - CU% and uniformity of distribution - DU%). The Randomised Complete Block Design (RCBD) was used. The meteorological data (Wind speed, air temperature and relative humidity) were obtained from Shambat weather station at the times of tests. Data were analysed using Statistical Analysis System programme (SAS).The statistical analysis showed that there were significant differences ($P \leq 0.05$) in CU% and DU% values at the different periods of the day under the two operating pressures and the two riser heights. The highest CU% and DU% values of 84 % and 78 %, respectively, were obtained in the morning tests under the operating pressure of 2.0 bar and riser height of 1.0 m. Higher efficiencies were obtained at low wind speeds , high relative humidity and low temperatures. All CU% and DU% values were within the acceptable range as stated by Keller and Bliesner (1990). Operating pressure and riser height should be considered when designing sprinkler systems, while the prevailing weather conditions should be considered when operating the system.

**Keywords:** pressure, coefficient , distribution uniformity , drift. , evaporation , losses , sprinkler, weather

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