



Investigation of riser height and operating pressure on sprinkler irrigation performance under different wind condition

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Abstract: Due to limitation of water resources in Egypt and booming population more efficient techniques of irrigation are required. These techniques should be able to control the amount of water applied and its timing more precisely to save on water amount and maximize the productivity. The current research investigates sprinkler irrigation system performance. The main objective of this study was to evaluate: the effect of riser height and operating pressure on sprinkler irrigation performance and water application under different wind speed conditions and different irrigation time. The study was applied on sandy soil cultivated with intensive crops, barley (*Hordeumvulgare* L.) Giza 129 variety.

To achieve this goal the field experiments were carried out during two successive winter seasons of 2013/14 and 2014/15 at the Research and Production Station, National Research Center, El-Nubaria Province, El-Behira Governorate, Egypt. The statistic experimental design was spilt spilt plot design. Eighteen cultivated areas were irrigated by movable sprinkling system, in different parts of the day. Nine areas were irrigated with riser height 1m and the rest with 1.5m. For each riser height areas three areas were irrigated at morning, three at midday and three at evening. The morning three areas as well as those of midday and evening (of each riser height) were irrigated at different pressure levels, 2.5, 3.0 and 3.5 bars. The results show that, the wetted diameter area increased by increasing the pressure level, especially from 2.5 to 3 bar. The wind speed at the evening achieved significantly the highest value of wetted diameter. Irrigation at evening gives the highest wetted diameter area especially with 3 bar pressure. The riser height 1m have better wetted diameter than 1.5 m riser at 2.5 bar and 3 bar, with insignificant difference at 3.5 bar. This study highly recommends sprinkler irrigation with 3 bar pressure and riser height at 1 m at evening. This will give the highest irrigation wetted diameter.

Keywords: Movable sprinkler irrigation system, Riser height, Operating pressure, Wind speed, Irrigation performance, Water productivity.