Effect of tillage on water advancing and distribution under surge and continuous furrow irrigation for cotton in Egypt

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Abstract:

A field experiment was carried out to assess the effect of tillage on water advance and water distribution in the root zone area (0.5 m) under continuous and surge flow irrigation in a cotton field. The experiment was conducted at the Agriculture Experimental Station, Assiut University, Assiut, Egypt. The location was classified as clay soil. The furrows with blocked ends were 76 cm long and 0.70m wide with 0.0024mm\textsuperscript{-1} of slope. To monitor the advance time, six points were established along the furrows at 9, 18, 27, 36, 45 and 76m from the inlet. In order to study the water distribution along the furrows, soil moisture content was measured using the gravimetric method at 0.0-0.25 and 0.25-0.50m depths at the beginning, middle and end of the furrows. A hand hoeing tillage system (HH) was compared with a weed control tillage system (WC) under continuous flow (CF) and surge flow irrigation (SF). Hand hoeing tillage decreased the water advance time compared to weed control tillage either under continuous or surge flow irrigation. Surge flow also decreased the advance time compared to continuous flow. The greatest effect on the advance time reduction resulted from the combined effect of surge flow with tillage (SFHH), which reduced the total supplied water by 22.4 and 25.7% during the first and second irrigation, respectively. The single effect of either tillage (CFHH) or surging (SFWC) also reduced the total amount of supplied water compared to continuous flow with weed control tillage (CFWC), but the reduction was less than that in the combined treatments. Due to tillage and surge effects, soil water was efficiently used and distributed uniformly along the furrow length. Combining surge irrigation and tillage could be an efficient method to use irrigation water efficiently and ensure uniform distribution of soil water. Copyright # 2006 John Wiley & Sons, Ltd.

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