THESIS

ASSESSMENT OF WETTING PATTERENS AS AFFECTED BY IRRIGATION AMOUNT AND TIME DURING DRIP IRRIGATION SYSTEM

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(2012-MS-WRE-20)

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2015

ABSTRACT

Drip irrigation has received much attention in the last two decades and normally considered as a better alternative for water savings with high degree of uniformity, reducing both time and irrigation amount. Drip irrigation performances are dependent on emitter water application rate and soil conditions in the field. Present study focus mainly on the impact of different size and shape emitters on wetting patterns, in irrigated environment.

Field experiments were executed at two different locations varying in soil types where drip irrigation systems were already installed. Field data was collected using two types of emitter water application i.e. point source and multi-source with six replication for comprehensive results. Impacts of the shape and size of emitters on dynamic of saturated zone radius, i.e. radial and vertical wetted distance were examined in this study. The width of the radial wetting pattern and vertical wetted depth was measured by measuring tape and soil drill. Three different types of emitters were used having flow rates of 0.5, 1.2, 1.5, 1.7 and 2.3 lph on each lateral and water application period was set from 1 ~ 5 hrs.

Results from the present study revealed that WETUP model was applied for calculating wetting patterns. Turbo type local emitters tends to 55% loss of water via infiltration comparatively turbo type (imported) and 45% more loss than spiral emitters as compared to field results in comparison with WETUP simulated results. The most suitable discharge found for all types of emitter is 1.7lph. Suitable distance for deep rooted crops to avoid the interference of multi- dripper wetting patterns was found in the range of 5m to 6m but shallow rotted crops this spacing of emitters should be in the range of 28cm to 35cm to achieve the highest emitter performance. Spiral type emitters perform well among other emitters and safely recommended for both soils in the present study. Further studies are needed to address the wetting patterns of various type emitters in a variety of field and climatic conditions.