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# Evaluation of wetting area and water distribution on different soils in subsurface drip irrigation emitters

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Growing pressure on the world's available water resources has led to an increase in the efficiency and productivity of water-use of irrigation systems in arid and semi-arid regions with water scarcity. In this context, sub-surface drip irrigation, where emitters discharge water underneath the soil surface, might help by saving water since soil evaporation, surface runoff, and deep percolation are greatly reduced or eliminated. In this paper, the wetting area and water distribution on light, medium and heavy texture homogeneous soils in subsurface drip irrigation emitters were evaluated. Experimental tests were carried out in a plexiglass lysimeter container with transparent walls. Emitters were buried at 15, 30 and 45 cm depths and discharge rates of 2 and 4 L/h were applied. Observations of wetting bulbs dimensions showed that water moved more laterally than downwards for higher emitter discharges. However, small emitter discharges enhanced water to move downwards. Likewise, higher emitter discharges also favored water to move upwards toward the soil surface. Water redistribution was affected by emitter depth. For the same emitter discharge, the deepest depth showed less water redistributed in the down vertical and horizontal directions but the contrary was observed for shallow depths. This could be explained considering the dry soil area above the emitter that is larger in the deepest emitters. Observations on wetting bulb dimensions and water distributions could aim at the selection of proper design variables (emitter depth), and/or operation variables (inlet head and irrigation time) in the studied soils under different scenarios of cropping patterns.

Key Words: subsurface drip irrigation, wetting bulb, soil water distribution, water redistribution, optimum management