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2010 International Annual Meetings

Oct. 31-Nov. 4 | Long Beach, CA



Green Revolution 2.0: Food+Energy and Environmental Security

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325-12 Irrigating Slow and at Night Maximizes Wetted Soil Area of Subsurface Drip Irrigation On An Amarillo Soil Series.

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Wednesday, November 3, 2010

Long Beach Convention Center, Exhibit Hall BC, Lower Level

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Irrigation of crops with subsurface drip (SDI) continues to increase in the Texas High Plains (THP). However, information on the effect of drip-tape positioning and irrigation strategies on the wetted soil area (WSA) is needed to optimize rainwater harvesting under limited well capacities, which are characteristics of the THP. The time and financial resources necessary to test all possible SDI strategies for different field conditions for the THP is sizeable and too large to be determined by field experiments alone. However, a numerical and mechanistic model such as Hydrus-2D/3D can be used to quantify the effect of different installation geometries and irrigation strategies. Therefore, the objectives of this work were: i) to experimentally validate the Hydrus-2D/3D in an Amarillo soil series and the semi-arid climate of THP, and ii) use the validated model to explore different irrigation frequency and timing strategies for cotton irrigated with SDI on alternate rows. The results showed that Hydrus-2D/3D calculated volumetric soil water content within ~ 3% of measured values, indicating that the model can evaluate different irrigation designs in an Amarillo soil series. Furthermore, simulated results for the irrigation frequency and timing strategies suggested that in order to maximize the WSA irrigation water should be applied as slow as possible and at night, when the crop's evaporative demand for water is minimal.

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