Analysis of Diurnal Patterns of Soil Water Fluctuation in Irrigated Potato. (S06-starr094544-Oral)

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Abstract:

Irrigated potato production in the central sands region of Wisconsin suffers from rapid drainage and concurrent chemical and nutrient transport to groundwater. Soil water content time series were measured across a potato hill in sandy soil using time domain reflectometry to evaluate water flow and uptake patterns. Hydrophobic dry zones developed in the center of potato hills and relatively wet soil persisted at the base. Diurnal variations were evident in the root zone when soil was not excessively dry. The temporal profile of the diurnal soil water cycle indicated a direct link with evapotransporation. The power in the diurnal peak of spectral density was calculated, and this may be a diagnostic indicator of localized water removal by roots and evaporation. The hydrophobic zone is problematic because root uptake from that area ceases, sprinkler irrigation does not penetrate effectively, and water is diverted toward a rapidly draining base region of the potato hill. Management practices targeted at improving soil wetting properties or altering water flow toward the center of the hill would likely improve water use and production efficiency under these conditions.

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