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Soil and Water Research

Wetting angle and water sorptivity in mineral soils

Czachor H., Flis-Bujak M., Kafarski M., Król A.:

Soil & Water Res., 3 (2008): S52-S57

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Two simple models of a non-cylindrical (wavy) capillary have been applied to show the impact of pore shape and of wetting angle on water sorptivity in soils. Wetting angle derived from the Washburn approach gives an overestimated value because of pores are modelled as round capillary tubes, whereas in reality they are tortuous, wavy and interconnected. In wavy capillaries, the impact of wetting angle on water sorptivity and capillarity driven water transport can be much more pronounced in relation to Washburn approach. An observed wetting front movement can be seen as a superposition of micro jumps and rests. Experiments carried out with glass powder and two soils confirm the above predictions.

Keywords:

sub-critical repellency; Washburn theory; wavy capillary

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