



The Impact of Soil Water Repellency on Hydrological Properties of Soil, the Plant Growing Environment, Irrigation Efficiency and Water Consumption

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Soil water repellency causes at least temporal changes in the hydrological properties of a soil. These changes, among other things, often result in suboptimal growing conditions, reduced crop performance, and/or increased irrigation requirements. Water repellency in soil is more wide spread than previously thought and has been identified in many soil types under a wide array of climatic conditions and cropping systems worldwide. (Dekker et al., 2005) The reduction or loss of soil wettability caused by soil water repellency leads to drastically different hydrological behavior (Dekker et al. 2009), and reduces the ability of the soil to function as expected. Consequences of soil water repellency include increased runoff and preferential flow, reduced plant available water, reduced irrigation efficiency, suboptimal crop performance, increased requirement for water and other inputs, and increased potential for non-point source pollution. (Dekker et al., 2001) This presentation consolidates information on basic hydrological and soil system functions as they relate to the plant growth environment, irrigation efficiency and water conservation, and shows the differences between what happens in soils affected by varying levels of soil water repellency compared to wettable soils or soils where soil surfactants have been used to restore/optimize wettability. The impact on irrigation efficiency and the plant growth environment is also discussed. The conclusion is that the impact of soil water repellency compromises hydrological properties and the plant growth environment in a wider range of conditions than previously recognized and, therefore, deserves consideration in the management of soil and water in crop systems.