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A brief overview of the causes, impacts and amelioration of soil water repellency – a review

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This article describes the phenomenon of soil water repellency, starting from the fundamental principals of water transport and storage in soil. Soil water repellency is a reduction in the rate of wetting and retention of water in soil caused by the presence of hydrophobic coatings on soil particles. For crop production and the maintenance of amenity turf, water repellency can stress plants resulting in poorer yield quality or grass 'playability', respectively. The biological causes of water repellency, primarily the influence of fungi, will be discussed, as an understanding of the source of the problem will be beneficial in developing solutions. Exacerbation of repellency through climate change and the use of 'engineered' soils for amenity surfaces will be demonstrated using research findings from around the globe. In developing solutions to soil water repellency, its positive benefits, if maintained at very low levels, need to be considered. Water repellency is a key process in the physical stabilisation of soil and its impact on evaporation also needs to be considered. Before developing a rapid solution to repellency based only on water transport rates, a holistic understanding of the impacts on soil water relations is essential.

Keywords:

soil; water repellency; hydrophobicity; agriculture; land management; water shortages

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