Geophysical Research Abstracts, Vol. 7, 07289, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07289

0.1 Revolution on the Fairways: Combatting dry spots and preferential flow

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0.1.1 Abstract

Soil water repellency is much more wide-spread than formerly thought. In the last decades it has been a topic of study for soil scientists and hydrologists in countries all over the world. Water repellency is most common in sandy soils with grass cover and in nature reserves. Numerous sandy soils in greens, tees, and fairways are actually water repellent at the surface and in the rhizosphere during dry periods. As soils dry, hydrophobic compounds polymerize and water repellency increases. Once a critical moisture content is reached soils shift from wettable to non-wettable, impacting infiltration and unsaturated flow in affected soils, and consequently water use efficiency and turf quality. Localized dry spots (LDS) caused by water repellent soil continues to be a problem for many golf course superintendents. Due to increasing concern over the threat to surface and groundwater posed by the use of agrichemicals and organic fertilizers, studies on water repellent soils have also been focused on its typical flow with runoff and the existence of preferential flow paths. We investigated this common soil condition in the fairways of the Dutch golf course 'De Pan'. Spatial variability in degree of water repellency and soil water content were studied in transects by intensive measurements. Dry spots exhibited extreme water repellency (water drops remaining for more than six hours on the surface of soil samples) to a depth of more than 20 cm. Treatments with the surfactant Revolution tackled water repellency in the

surface layer, improved temporal infiltration rate of irrigation water, and increased the volumetric water content in the rootzone. Worthy to note are the differences in color, density uniformity, and quality of the turf between the treated and untreated parts of the fairways.

1 References

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