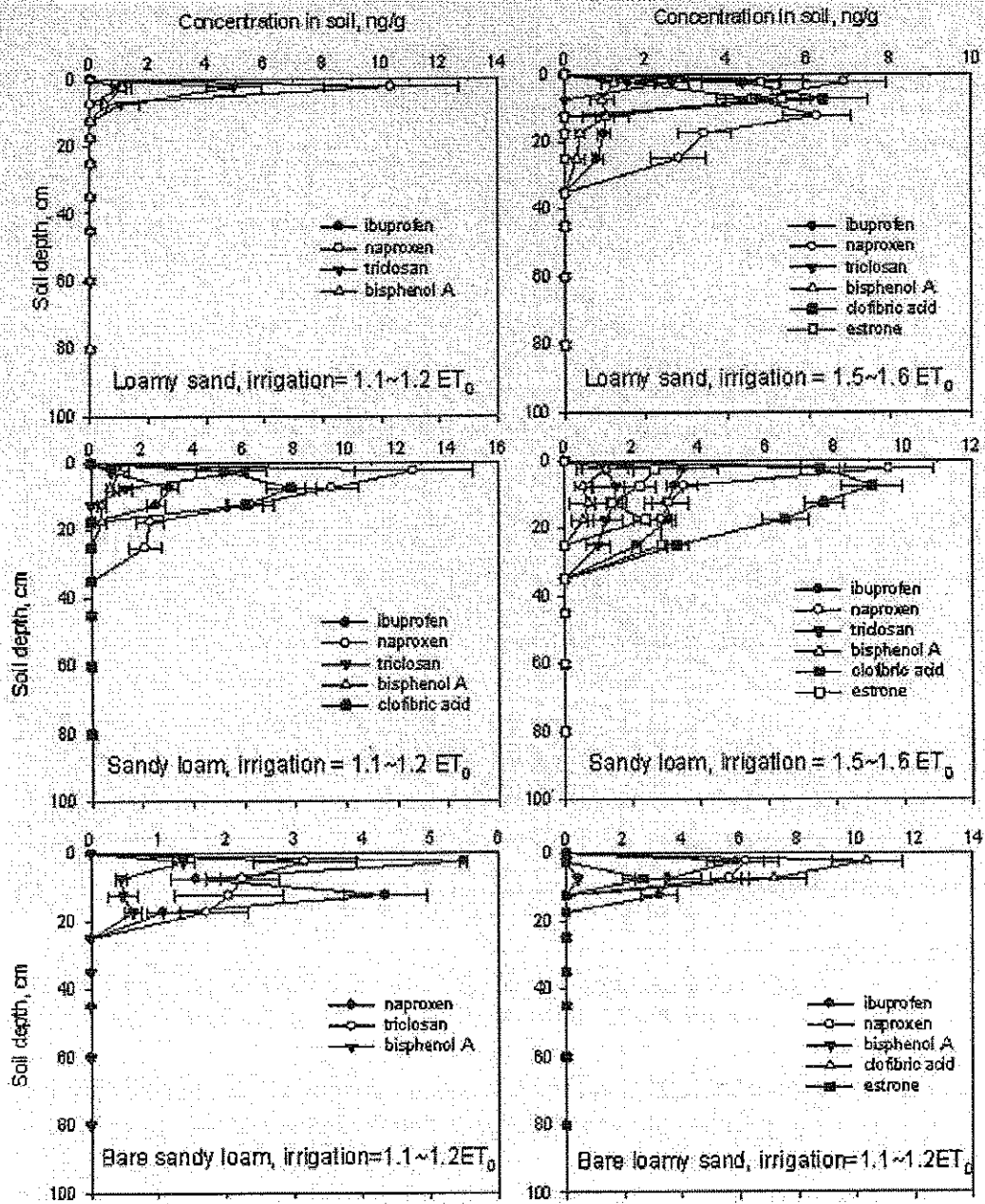


Pharmaceuticals and Personal Care Products (PPCPs), and Endocrine Disrupting Compounds (EDCs) Leaching in Reclaimed Municipal Wastewater Irrigated Turfgrass Soils

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The practice of irrigation with reclaimed water on landscape has been employed for many years in the world. However, the fate and transport of trace organic contaminants in reclaimed water, such as endocrine disrupting compounds (EDCs), steroid hormones, pharmaceutical and personal care products (PPCPs), have not been well documented. A field study was performed to assess the environmental behavior of these chemicals in turfgrass soil receiving reclaimed wastewater irrigation at the UCR Turf Research Facility. Selected compounds (PPCPs and EDCs) were spiked in the irrigation water. Two irrigation rates (1.1 to 1.2 and 1.5 to 1.6 of reference crop evapotranspiration (ET_0)) were applied on plots with two types of soils (sandy loam and loamy sand). Leachates were collected after each irrigation event and analyzed for the targeted compounds. The control treatment of four plots (two for each soil type) was established by removing the turfgrass and irrigated at 1.1 to 1.2 ET_0 . Four months after the experiment, soil samples from each plot were collected to a depth of 89 cm. The cores were sliced into nine sections and analyzed for the compounds in the soil profiles. Our study showed that no compound was detected in the leachates during the 4 mo of irrigation. Most compounds were found in the surface layers (0-30 cm depth). High irrigation rate (1.5 to 1.6 ET_0) enhanced the downward movement of chemicals in turfgrass soil and more compounds were found in the deeper depth, but no of them reached to the bottom of the 89-cm lysimeters.

Batch degradation experiments indicated that in turfgrass soils, microbial degradation was the dominant dissipation pathway for the tested compounds, whereas photochemical reaction only played a minor role.



Distribution of the 9 selected PPCPs and EDCs levels in the soil profiles at the end of 4-month irrigation.