



Movement of *Toxoplasma gondii* Oocysts in Unsaturated Natural Soils

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Toxoplasma gondii has a complex lifecycle that involves a wide variety of intermediate hosts with felids as the definitive host. Because of its numerous hosts and the prevalence of cats, *T.gondii* has spread throughout nearly the entire globe. Oocysts have been found not only in the feces of cats, but also in soils, animal feeds and water. Exposure through consumption of infected meat or following contact with cat feces can cause damage to the eyes, brain and other organs of immunocompromised populations as well as fetuses if they are exposed in utero. The prevalence of *T.gondii* and potential health risks necessitate a better understanding of the transport of *T.gondii* through soils, which to this point has not been well studied. This work aims to characterize the transport and retention of *T.gondii* oocysts in a number of unsaturated natural soils where fast transport and preferential flow paths have been prevented. The soils used are classified as loamy sands and sandy loams. They were placed in soil columns at a known bulk density and were then subjected to an artificial rain of 1 mM KCl solution. Flow in the columns was vertical and gravity driven. After steady state was reached, a pulse containing 2.5 million *T.gondii* oocysts and KBr as a conservative tracer was applied to the top of the column, after which steady rainfall was resumed. Leachate samples were collected throughout the experiment. qPCR for *T.gondii* was performed and KBr ions were measured to create breakthrough curves for both. After the completion of the rainfall portion of the experiment, soil columns were cut into 1 to 2 cm sections and analyzed for *T.gondii* with qPCR to characterize retention within the column and for soil water content.