# Identification of Microplastics in Soil Using Fluorescence

Sweeney, Cecilia (School: Saint Johnsbury Academy)

Microplastics are plastic particles that are less than 5mm long that come from the breakdown of larger plastics and the use of synthetic polymers in manufacturing, and have been shown to have many adverse effects on living organisms. Microplastics have been found in both aquatic and terrestrial ecosystems, however, the study of their effects on terrestrial ecosystems is a very recent field of research. As such, there is little research on how best to detect microplastics in soil. The purpose of this research is to evaluate the efficacy of current microplastic detection methods when applied specifically to microplastics in soil. To achieve this, three peer-reviewed papers focusing on different fluorescence-based methods for microplastic detection were examined and adapted to create a procedure in which five different treatments, four dye-based and one heat-based, were applied to three different types of microplastics: PS (polystyrene) 30–60 mesh, PS 200–400 mesh, and PE (polyethylene) <400µm, all of which were mixed into soil samples. After applying treatments, the soil and plastic mixtures were examined under a fluorescence microscope and photographed. After image analysis, it was found that PS 200–400 mesh in treatment one (the highest concentration of dye) was most visible, PS 30–60 mesh in treatment one was also highly visible, while only a few dots of PS 30–60 mesh in treatment two were visible, and the rest of the images were completely black. This suggests that a high concentration of dye is most effective, specifically when used to detect polystyrene as opposed to polyethylene. This also suggests that the size of the plastic particles does not impact efficacy. No evidence for the efficacy of autofluorescence-based methods was found.

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