Abstract No: 100 ***Life sciences***

EFFECT OF MICROPLASTICS ON GROWTH OF *Solanum lycopersicum* AND SOIL ARBUSCULAR MYCORRHIZAL FUNGI

W.M.T.M. Weerasinghe* and H.M.S.P. Madawala

Department of Botany, Faculty of Science, University of Peradeniya, Peradeniya, Sri Lanka
**weerasinghethilini8@gmail.com*

Microplastic (MP) contamination of agricultural soils is a major concern today. Here we investigated the effects of MPs on the growth of *Solanum lycopersicum* and Arbuscular Mycorrhizal Fungi (AMF) abundance. A pot experiment was conducted in a glasshouse using garden soil mixed with two types of MPs, microfibers (MFB) and microfilms (MFL), to achieve MP concentrations, 0.0, 0.4, 2.4, 4.4, 6.4 and 8.4%. Ten seedlings of *S. lycopersicum* were raised per pot from seeds and left only two seedlings per pot. Six replicates were used for each treatment. Plant height was measured weekly for 13 weeks before harvesting destructively. Relative growth increment (as a percentage of the initial height), relative growth rate (RGR), root weight ratio (RWR) and root: shoot ratio (RSR) were calculated. Chlorophyll levels were quantified spectrophotometrically using randomly selected mature leaves. The AMF spores were quantified by extracting spores using the wet sieving and decanting method. Irrespective of the MP type, a concentration-dependent reduction in growth increments over time was detected compared to the control (with no MPs). After 13 weeks, the RGR also showed a similar reduction in the presence of MPs ($F = 13.74$; $p \leq 0.0001$). The RSR gradually declined with the increasing levels of MPs. The decline in RSR was due to reduced biomass allocation to above-ground parts (55 and 40% decline with MFL and MFB, respectively) compared to a 6 and 22% decline in root allocations (compared to control plants). Plants grown with MFBs had significantly higher chlorophyll content than MFLs ($F = 18.33$; $p \leq 0.0001$). Despite the type, MPs also significantly reduced the AMF spore density ($F = 108.1$; $p \leq 0.0001$), confirming their negative role on soil microbes. The smallest and the largest spores (< 45 μm and > 500 μm) were notably more prevalent in soils without MPs than soils with MPs. Overall, results suggest that MPs negatively influence the vegetative growth of *S. lycopersicum* and the abundance of AMF spores. Understanding the impacts of MPs on the soil-plant system is imperative to minimise risks posed by soil MPs in agriculture.

Keywords: AMF, Microfibers, Microfilms, Tomato, Vegetative growth