



## Microplastics in Agricultural applications

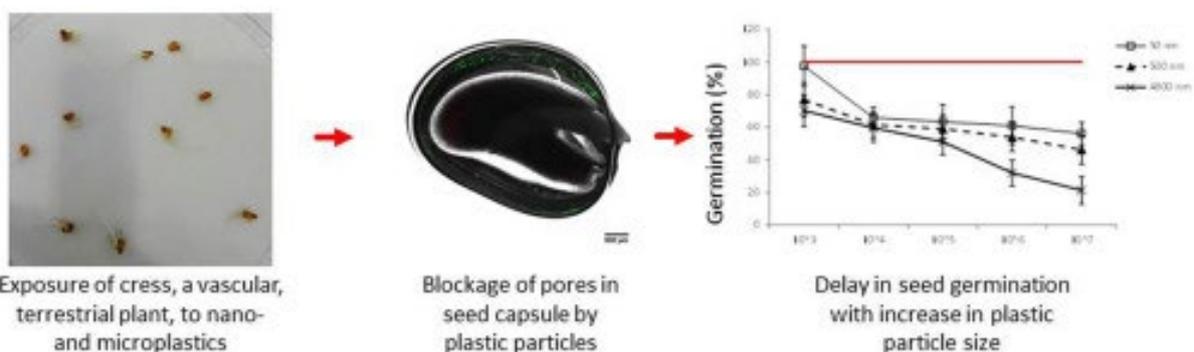
Microplastics (i.e., plastic particles less than 5mm in size) have been identified as a global environmental threat for terrestrial and aquatic ecosystems and human health. Agriculture is assumed to be both victim and polluter of microplastic pollution.

Encapsulating fungicides and/or insecticides in film-coatings applied to agronomic seeds has become a widely accepted method for enhancing seed germination and overall seedling health by protecting against many diseases and early-season insect pests.

### Leiden University, Institute of Environmental Sciences and the Department of Biology, Woods Hole Oceanographic Institution USA

In a recent study of Leiden University, Institute of Environmental Sciences and the Department of Biology, Woods Hole Oceanographic Institution USA July 2019. The effect of polymer coated seeds showed a drop in germination

- Exposure to plastics caused significant impacts on germination and root growth.
- Late germination is likely related to accumulation of microplastics on seed case.



This on it's own should be reason enough to switch to a non-polymer seed coating regardless of the environmental pollution into the soils and therefore into the groundwater.

Ad Terram doesn't use microplastics in their products, not in the seed coating, Encrustment or Pelleting products and also not in their biostimulants.

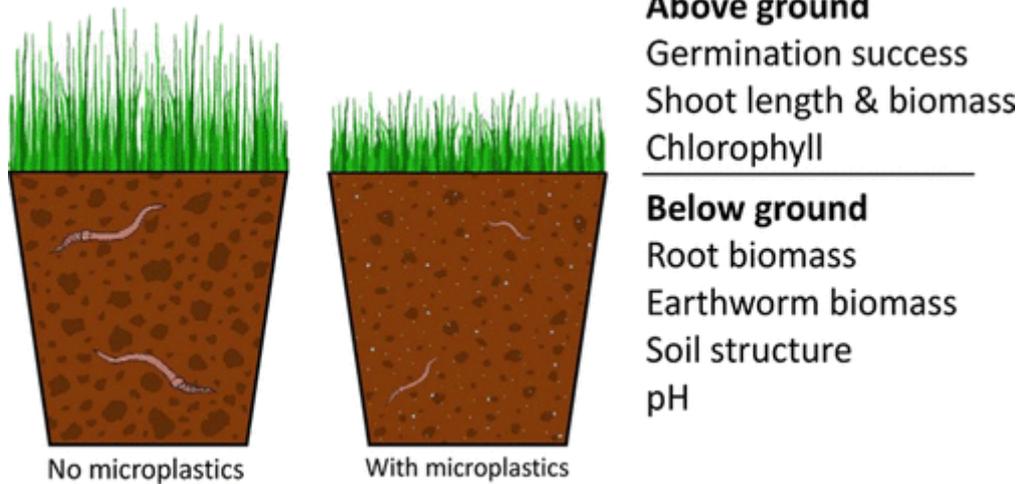


Environmental contamination by microplastics is now considered an emerging threat to biodiversity and ecosystem functioning. Soil ecosystems, particularly agricultural land, have been recognized as a major sink of microplastics, but the impacts of microplastics on soil ecosystems (e.g., above and below ground) remain largely unknown

### In a study of Bas Boots, Connor William Russell, Dannielle Senga Green

*Publication: Environmental Science & Technology*  
*Publisher: American Chemical Society*

Date: Oct 1, different types of microplastics [biodegradable polylactic acid (PLA)], conventional high-density polyethylene (HDPE), and microplastic clothing fibers were added to soil containing the endogeic *Aporrectodea rosea* (rosy-tipped earthworm) and planted with *Lolium perenne* (perennial ryegrass) to assess the biophysical soil response in a mesocosm experiment. When exposed to fibers or PLA microplastics, fewer seeds germinated. There was also a reduction in shoot height with PLA. The biomass of *A. rosea* exposed to HDPE was significantly reduced compared to control samples. Furthermore, with HDPE present there was a decrease in soil pH. The size distribution of water-stable soil aggregates was altered when microplastics were present, suggesting potential alterations of soil stability. This study provides evidence that microplastics manufactured of HDPE and PLA, and synthetic fibers can affect the development of *L. perenne*, health of *A. rosea* and basic, but crucial soil properties, with potential further impacts on soil ecosystem functioning.



So more and more becomes clear that beside all the environmental impact that the use of microplastics has studies clearly show the negative impact of the use of microplastics in agriculture.

A lot of companies promote that they (are going to) use Bio-plastics as a alternative for the conventional plastics. However this seems not to be a solution due to the fact that bio-plastics generate the same problems than conventional plastics as a study shows by *V.C. Shruti Centro Mexicano para la Producción más Limpia (CMP+L), Instituto Politécnico Nacional (IPN) and Gurusamy Kutralam-Mmuniasamy Department of Biotechnology and Bioengineering, Centro de Investigación y de Estudios Avanzados, Instituto Politécnico Nacional, Ciudad de México, Mexico* in their publication; *Bioplastics: Missing link in the era of Microplastics*. Of 20<sup>th</sup> of December 2019.

Therefore the use of microplastics bio-plastics is not advisable and generates growth deformation and/or lower germination.

Unfortunately it doesn't stop here, latest studies show unexpected toxicity increase caused by microplastics in Rice seedlings;

Publication: *Microplastic particles increase arsenic toxicity to rice seedlings by Agro-Environmental Protection Institute, Ministry of Agriculture of China And Department of Civil and Environmental Engineering, Shantou University, Shantou, 515063, China And The New Zealand Institute for Plant and Food Research Limited, Private Bag 4704, Christchurch, 8140, New Zealand*



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Some highlights of this research:

- Microplastic particles combined with As(III) can inhibit the growth of rice seedling.
- Microplastic particles combined with As(III) would restrain root activity, RuBisCO activity and photosynthesis.
- PS and PTEF decreased As(III) uptake of rice seedling.

So many practical reasons not to use microplastics in your treatment products.

Jan Tamboer

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