

DUST LOAD OF AGRICULTURAL ORIGIN, WITH PARTICULAR REGARD TO ITS TOXIC ELEMENT CONTENT.

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Abstract

There is a worldwide increasing interest in air pollution problem today. Wind transport and deposition of soil is recognized worldwide as an important environmental problem, as a large proportion of the environmental dust consists of fine particles from natural soil. Coarse and fine particles are released into the atmosphere through a variety of mechanisms, depending on the composition, size, concentration and duration of the particles in the atmosphere. Thus, mineral aerosols have a significant impact on air quality at local, regional and continental levels. Particles smaller than 10 μ m in diameter (PM₁₀ and PM_{2.5}) are easily transported by the wind. Eroded soil contains organic matter, heavy metals, pesticides, fertilizers, etc. Therefore, the study of the spatial and temporal changes in the content of soil toxic elements (pesticides, heavy metals) due to deflation is important from an environmental and human health point of view. The finer particles of soil transported by the wind, when introduced into the towns / villages, can contribute to the dust load of the settlements through dry and wet atmospheric deposition. So, it is important to examine the spatial and temporal variations in the harmful and pollutant content of the topsoils. These effects can be tested by wind tunnel experiments. [1, 2]

In this study, we investigated the behavior of pesticides in wind-eroded sediment portable wind tunnel and a Wet Active Sediment Trap (WAST) and. WAST is a horizontal active trap that is patterned at different heights, isokinetic, wet trap to collect the suspended soil fractions [3]. Trap inlets are 5-10 cm, 20-25 cm, 50-55 cm high. The rolling soil fractions were collected too, in a tray at the end of the wind tunnel. In summer 2019, we collected chernozem and sandy soils from arable land near Szeged and took ex-situ measurements. Before the experiment, a part of the soil samples were treated with chlorpyrifos (2l/ha) and pendimethalin (5l/ha). Control soil samples were also measured.

We examined the topsoil samples (pH (H₂O), CaCO₃, Arany yarn test, OM %, total salt content, humidity and pendimethalin and chlorpyrifos contents and the toxic element contents in the collected soil fractions. Pesticide measurements are made by LC-MS according to hungarian standards.

First results indicated that that chlorpyrifos and pendimethalin contents were higher in the rolling particles and in the particles collected at 5-10 cm.

Keywords

dust, wind-eroded soil, toxic elements, wind tunnel

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References

- [1] Toy, T.J., Foster, G.R., Renard, K.G.: Soil erosion: Processes, Prediction, Measurement, and Control. New York: John Wiley and Sons, 338 p. (2002).
- [2] Gossens, D.: On-site and off-site effects of wind erosion. In: Wind erosion on agricultural land in Europe (ed.:Warren, A.). Office for Official Publications of the European Communities. EUR 20370, pp. 29-38. (2002)
- [3] Farsang, A.: A víz- és szélrózió szerepe a talaj humusz- és elemtartalmának horizontális átrendeződésében. MTA doktori értekezés. Szeged, 183 p. (2016).