



21-22 November 2024

THE EFFECT OF SOIL AERATION ON THE CHEMICAL AND BIOLOGICAL PARAMETERS OF THE SOIL

Vanda Veres¹, Patrik Krizsán¹, Erzsébet Csengeri¹

Hungarian University of Agriculture and Life Sciences, Institute of Environmental Sciences

Department of Irrigation and Land Improvement¹

Szabadságút 1-3. 5540 Szarvas, Hungary

Abstract: In Hungary, climate change has brought about an extreme increase in temperatures in the summer months and a decrease in the amount and intensity of precipitation. An in direct consequence of climate change is soil degradation. The increasingly intensive use of agricultural techniques also promotes the soil degradation process. With the soil aeration process, the harmful processes that occur can be stopped and reversed. Our studies follow the change in soil moisture, (also average of glomalin and FDA activity) which was carried out using in situ and ex situ methods. The results obtained do not show significant differences, which could have been influenced by wea ther extremes. The tests will be performed again next year.

• Introduction

Extreme climate events in Hungary danger to the fertile soil. It was typical of the summer months that their average temperature always exceeded the same month of the previous year. The lack of precipitation also affected the extreme category. These meteorological factors lead to soil damage. First, the literature reports on the lack of soil moisture, and then on the drastic reduction of deep groundwater. Soil resistance and moisture content must always be examined at the same time at the same time (Rátonyi 1999). Along with the increase in moisture content, the tendency for soil compaction also increases (Birkás et al., 1996). The amount of glomalin strongly determines the structural properties of soils, including their friability and soil properties related to water retention and water conservation (Rilling, 2004). The production of this material shows a certain degree of seasonality.

• Material and method

Soil moisture was measured with the Daróczi-Lelkes PENETRONIK instrument.

Arbuscular mycorrhizal fungi (AMF) operationally defined, meaning that the identification of this protein restson the method sused to extract it (citricacid buffer; autoclaving at pH of either 7.0 or 8.0) and the as says (Bradford method/enzyme-linked immuno sorbentassay (ELISA) with MAb32B11) used for quantification (Rilling, 2004).

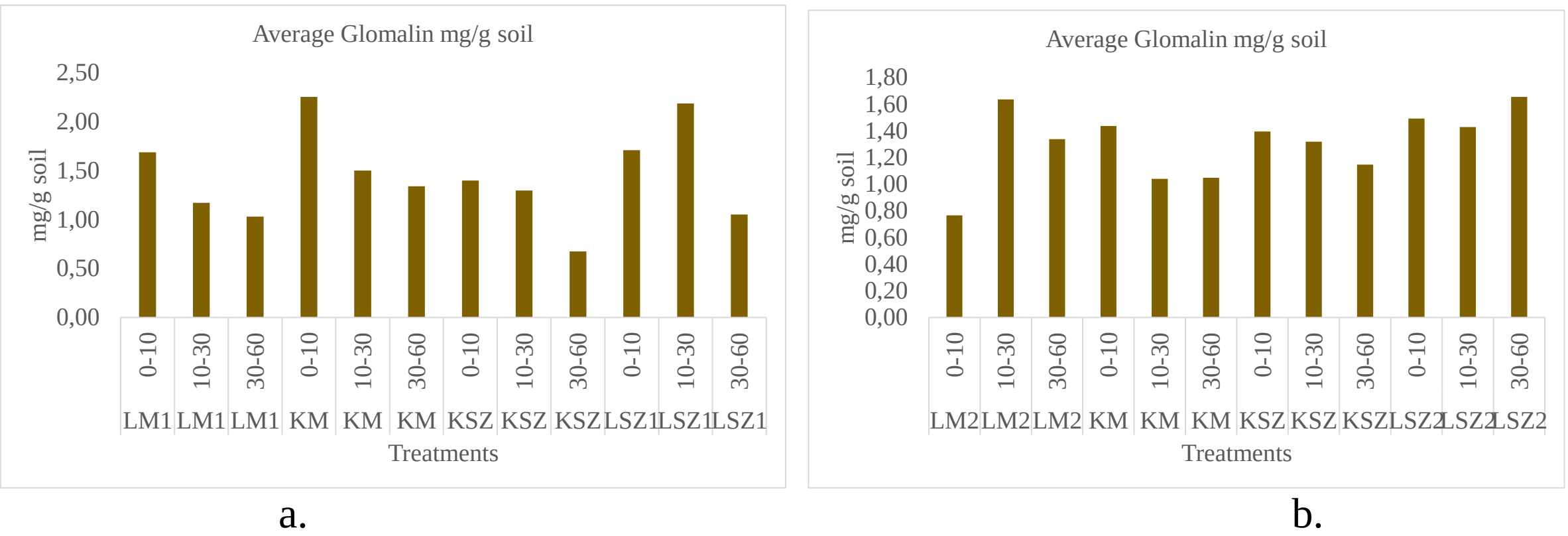
Colourless FDA is hydrolysed by both free and membrane bound enzymes, releasing a coloured end product fluorescein which can be measured by spectrophotometry. The advantage of this method is that it is simple, rapid and sensitive.

• Results and discussions

table 1.: Soil moisture in volume %

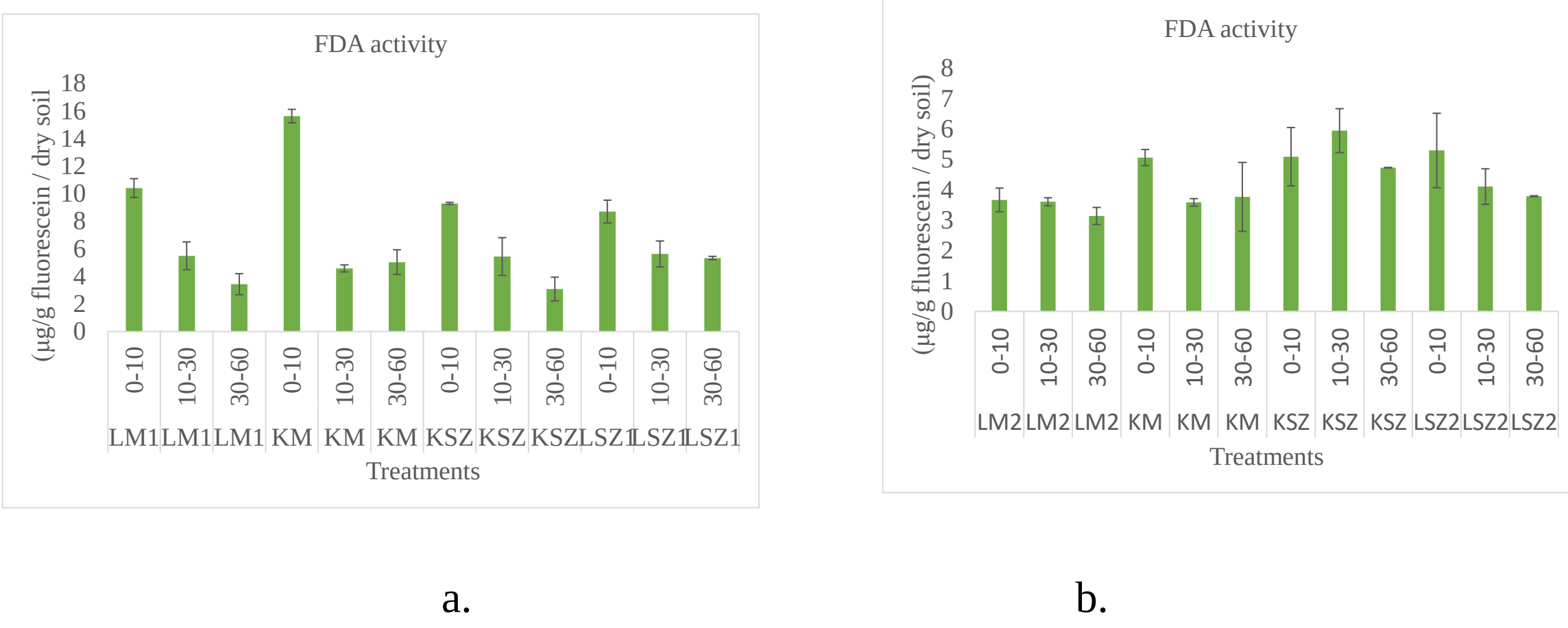
Treatments		21.02.2024.				3.04.2024.				25.04.2024.	
Method	Depth	KSZ	KM	LSZ(1)	LM(1)	KSZ	KM	LSZ (1)	LM(1)	LSZ(2)	LM(2)
ex situ	0-10	18,965 5	9,8712	9,5794	11,5299	12,3077	7,8261	11,3208	7,3634	15,3846	8,371
	10-30	18,22	9,2457	15,3846	11,674	14,4144	5,0926	12,2768	9,8592	11,3379	7,8556
	30-60	17,339 7	9,1549	17,5926	10,7579	17,5926	5,5422	15,0121	6,9212	11,2644	8,5575
in situ	0-10	18	14,3							18,25	10,5
	10-30	20,90	15,26							20,6	12,29
	30-60	21,7	17,7							21,5	14,81

The depth distribution of soil moisture clearly shows the soil's characteristic water retention power. The increase in soil moisture after aeration can be explained by the fact that a total of 16.2 mm of precipitation fell in the two days before sampling. It can be seen that higher values are typical in the upper layer of the soil.



1. figure: Change in glomalin level before (a) and after (b) soil aeration

After aeration, we expected an increase in the amount of glomalin, but we observed a decrease, the range of which is 0.77-1.63 mg/g. So many changes can be observed that it increased in the 10-30 cm depth (LM2, LSZ 2). So the biological life of the soil increased at a depth of 0-30 cm.



2 figure: Total microbiological activity values are the results of the first (a) and second (b) sampling

The results of the condition before aeration and the condition after aeration are illustrated due to the significant difference. The results show the overall microbial deterioration of the soil as a result of aeration. The results of the condition before aeration and the condition after aeration are illustrated due to the significant difference. The results show the overall microbial deterioration of the soil as a result of aeration.