ULST Timisoara
Multidisciplinary Conference on Sustainable Development
30-31 May 2024
2024 MULTIDISCIPLINARY CONFERENCE ON SUSTAINABLE DEVELOPMENT

CHANGES IN SOIL PHYSICAL PARAMETERS AS A RESULT OF SOIL AERATION

Vanda Veres[1], Erzsébet Csengeri[1], Patrik Krizsán[1]
[1]: Hungarian University of Agriculture and Life Sciences, Institute of Environmental Sciences, Department of Irrigation

Abstract: *Physical degradation of soil involves the destruction of soil structure, dispersion of soil particles, sealing of pores, compression and increasing density, consolidation, compaction and reduced root penetration, low infiltration, waterlogging and runoff, and accelerated erosion.. In the present experiment, the technology was applied in cherry and plum orchards in Tápiószele to evaluate the efficiency of soil aeration. Soil aeration, mechanical soil loosening by the introduction of compressed air. The experiments started with soil sampling in early 2024. We are measured soil resistivity and soil moisture with a Daróczi-Lelkes penetronik instrument in four replicates. Soil samples were taken from 0-10 cm, 10-30 cm and 30-60 cm depths as controls for soil moisture and soil resistivity. In the laboratory, we determined the gold binding number and the leachable fraction of the soil.*

• Introduction

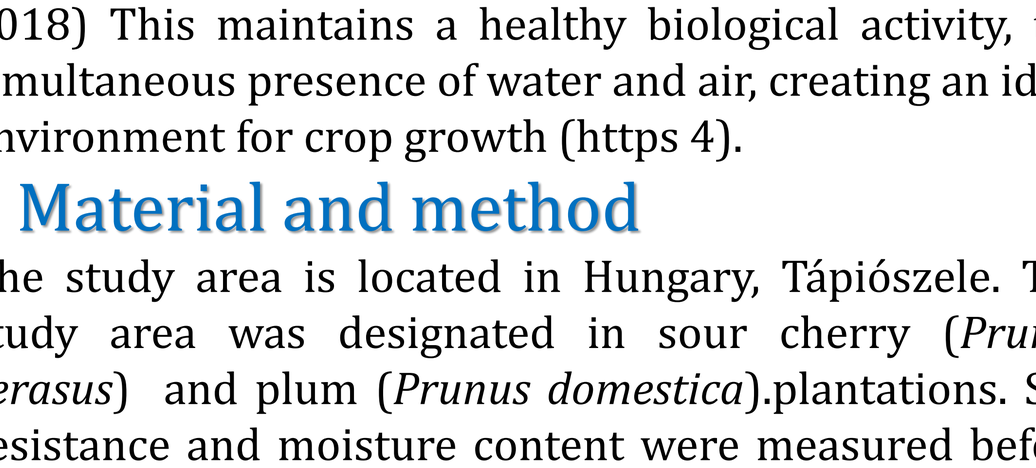
Soil degradation processes vary between agricultural sectors. Soil compaction also causes many problems in plantations because of the constant compaction of the soil by the machinery working between the rows, rainfall and possible irrigation.

The process of soil aeration and the aeration status of the soil not only influence the water and nutrient levels in the soil, but also have a decisive impact on fertility, compaction and soil structure. Soil aeration increases oxygen concentrations, which will be beneficial for plant roots and microbial populations, and reduces carbon dioxide concentrations (Ben-Noah, I., Friedman, S. P., 2018) This maintains a healthy biological activity, the simultaneous presence of water and air, creating an ideal environment for crop growth (https 4).

• Material and method

The study area is located in Hungary, Tápiószele. The study area was designated in sour cherry (*Prunus cerasus*) and plum (*Prunus domestica*).plantations. Soil resistance and moisture content were measured before and after soil aeration , with the Daróczi-Lelkes penetronik instrument from Szarvas. We defined Arany binding in laboratory conditions.

1. figure: Investigated area of sour cherry and plum



• Results and discussions

2. figure: May soil resistance results

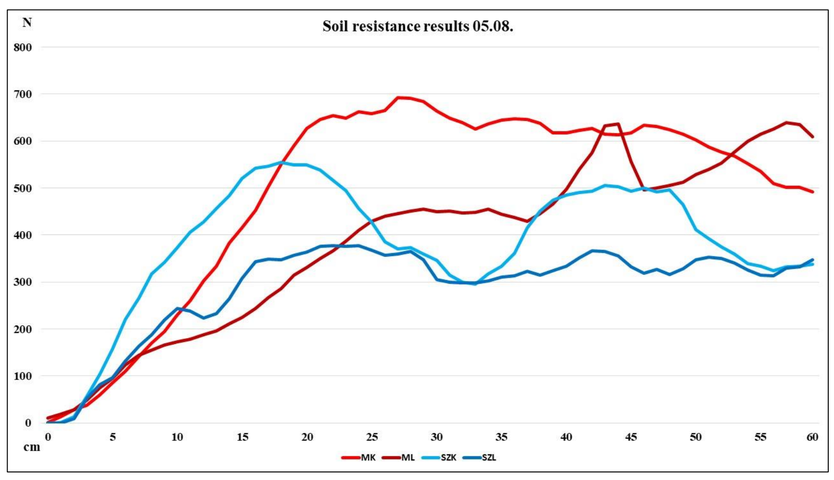
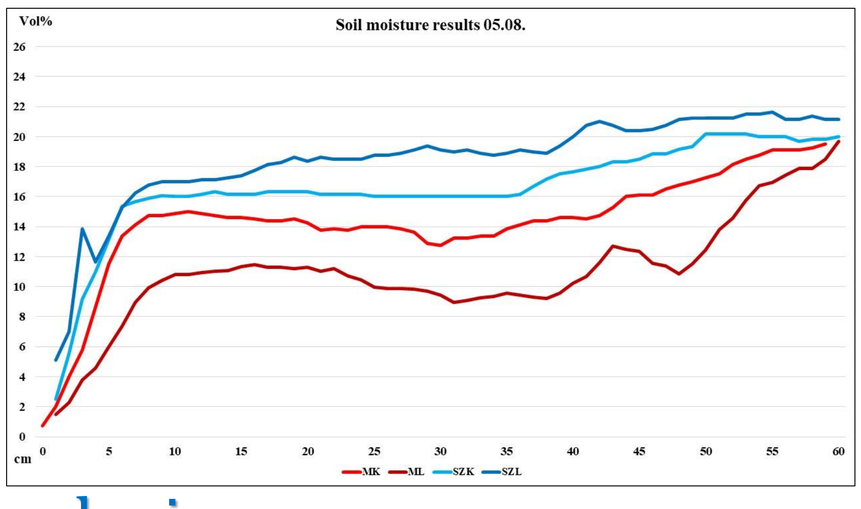


Figure 2 presents the results of soil resistance after soil aeration. It is clearly visible in the figure that the aerated treatments for sour cherry showed much lower soil resistance between depths of 10-45 cm, and for plum, the aerated treatments showed significantly lower soil resistance at depths of 10-20 cm and 40-50 cm compared to the control. This is due to the effect of soil aeration. The soil moisture results measured in May did not yet show any significant change due to aeration (3. figure).

3. figure: May soil moisture results



• Conclusions

In summary, it can be stated that in order to determine the most reliable results, the experiment needs to be conducted over several years. However, the current results have already pointed out the usefulness of soil aeration.