

YIELD, MORPHOLOGICAL AND PHYSIOLOGICAL PARAMETERS OF ORGANIC AVENA SATIVA L. PLANT AS AFFECTED BY MINERAL, ORGANO-MINERAL AND STEEL SLAG AMENDMENTS TO ACID SOIL

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Abstract

Oat (*Avena sativa* L.) is one of the most important self-fertilizing field plant belonging to the Poaceae family, with multiple purposes as a fodder plant and in human nutrition. Of all the cereals, it tolerates heavy and wet soils the best, but with a very good reaction to fertilization [1]. The current study evaluated the effects of solely application of mineral (NPK) and organo-mineral (OM) fertilizers, and their individual combination with steel slag (SS), on the certain measured morphological parameters (mean number of leaves per plant - MNLP; minimum leaf length per plant - MinLL, in cm; maximum leaf length per plant - MaxLL, in cm; number of ears per plant - NEP), physiological parameters [content of: chlorophyll - Chl, flavonoids - Flv, anthocyanins - Ant, nitrogen balance index (Chl/Flav Ratio) - NBI], and the yield, in oat crops, between the treatments and in relation to the control. The experiment was performed in semi-controlled greenhouse conditions, in pots, from the 4th decade of March to the 4th decade of June, in 2024, using organic oat seeds, with Eutric Cambisol [2]. The soil is characterized as a light clay with an acid reaction. Steel slag was taken from the steel factory different deposition sites and characterized to have very alkaline reaction, Ca and Mg contents mainly in their oxide forms, and high total Fe and Mn content (but with lower amounts in their soluble forms) [3]. NBI and the contents of Chl, Flv, Ant, were measured using portable Dualex optical leafclip sensor (FORCE-A, Orsay, France). The obtained results showed that the MNLP, MinLL, MaxLL, NEP, the contents of Chl, Flv, Ant and NB index, in organic oats, significantly differed between the treatments applied and in relation to control. The effect of treatments on obtained oat yield insignificantly differed between the treatments, but significantly in relation to the control. The best results were obtained with the use of OM+SS, whereby good results were obtained with the NPK+SS use. Concluding, applied steel slag, in combination with mineral and organo-mineral fertilizer, respectively, showed the positive effects on the morphological and physiological parameters in organic oat and its yield, grown on acid type of soil. Regarding this research, in such combinations steel slag showed high potential in usage toward improvement of tested soil fertility without adverse effects.

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References

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