THE DOSE MATTERS: BENEFITS AND DRAWBACKS OF BIOCHARSOIL AMENDMENT

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Abstract -
Biochar is commonly used as an organic ameliorant improving water quantity by increasing soil retention, utilization of nutrients and agrochemicals for plants and crops, thus increasing plant growth and resistance to stress. It can stimulate plant growth, leading to greater leaf area, larger plant stems, and wider inflorescence or more seeds. It can stabilise physiological parameters and reduce stress symptoms, mainly under water shortage conditions. However, the effect of biochar application could result in both positive and negative effects. Our experimental studies were focused on plant characteristics such as plant growth and productivity, as well as stress physiological parameters, including leaf transpiration and the efficiency of photosystem II (PSII). The results of studies on sugar beet, peas, and ornamental plants in green walls show interesting results. Biochar has a positive effect in lower doses (2 % wt.) and as a mixture with manure or with added nutrients in crops. It can increase the sugar content of beet tubers and increase the biomass of whole plants. It improves the survival of plants in green walls and lowered their stress during overwintering. In contrast, the addition of biochar does not have an effect without nutrient addition. Moreover, it reduces plant growth when they are irrigated with grey waste water or when a higher concentration of biochar was applied. The results of our studies strongly point to the conclusion that, besides the properties of biochar, the dose, quality of water used for irrigation, and nutrient supply are of key importance during the biochar application as a soil amendment.

Keywords - Experiments, Green Walls, Grey Water, Organic Amendment, Physiological Parameters, Water Stress