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Effects of Biodynamic Preparation 500 (P500) Cow Horn Manure on Early Growth of Barley, Pea, Quinoa, and Tomato under Saline Stress Conditions

EUSUN HAN¹, CORY WHITNEY², WIEBKE NIETHER³, WILLIAM NELSON⁴, TON BAARS⁵

¹*University of Bonn, Institute of Organic Agriculture, Germany*

²*University of Kassel, Fac. of Organic Agricultural Sciences, Germany*

³*Georg-August-Universität Göttingen, Dept. of Landscape Ecology, Germany*

⁴*Georg-August-Universität Göttingen, Institute of Crop Production Systems in the Tropics, Germany*

⁵*Juchowo Farm, Poland*

Abstract

Large areas of salt-affected soils are found in tropics, especially in Africa, South America and the Middle East. While soil salinity might lead to food insecurity in those regions and affect farmers who are most vulnerable to environmental stress, however, little is known how the abiotic stress can be managed with locally available resources without involving high cost. Decades of practical evidence have demonstrated the benefits of the farm input, called biodynamic preparation 500 (P500) cow horn manure, such as improving crop performance and providing resilience against various stress conditions. Organic agriculture is already seen as an important issue in sustainable crop production in the tropics, but also biodynamic philosophy and agricultural practices are discovering tropical countries. Biodynamic preparations in tropical crop production are already in use, while there is a lack of research concerning their performance. This study was conducted to quantitatively determine the effects of P500 on the early growth of different crops under saline condition. A randomised block design with six replicates in a green house chamber pot trial consisting of two factors, viz., SALT (stressed and control) and PREP (P500 and blank) was run with four crop species that have importance in temperate and tropical countries, viz., barley, pea, quinoa and tomato. Plants were harvested 38 days after sowing and aerial biomass dry matter (DM g) was measured. Results suggest that the application of P500 significantly enhanced the initial biomass production of all tested crops, even under saline conditions (except for tomato). In all crops the biomass yield was significantly improved, average 18.5 % and 16.7 % for non-saline and saline treatments, respectively. Findings suggest that P500 may be a measure to mitigate the stress from adverse environmental conditions for crop plants. Thus, future research with more genotypes, varieties, and crop species, in field conditions where the soils suffer from extreme abiotic stress, should be followed.

Keywords: Biodynamic, biomass, salinity, stress