Crop Meshing Method (CMM): Drought Resilience Through Intentional Soil Development

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The soil water balance is determined by the soil structure. Due to climate change, optimizing the water balance of agricultural soils is desired. In my previous project, I conceptualized the Crop Meshing Method (CMM) and cultivated an experimental culture (including comparative cultures) in standardized experimental tanks to investigate its practical feasibility. In the present work, the CMM is investigated regarding soil ecological processes. Specifically, the dynamic equilibrium in the construction and degradation of biological crumbly structure including biotic aggregation is examined. Using several soil analytical methods, key parameters were analyzed. A soil analysis was conducted including infiltration and respiration rates as well as pF-curves and examinations of microstructure morphology. Using t-tests and curve approximations, the data were analyzed. Focusing on the interlinking interpretation of measurements, the soil ecological network of processes was traced. Unfortunately, the 2021 flood in the Eifel region, Germany interrupted the cropping experiment. As a side effect of the flood, it was possible to record the reaction to heavy rain. The results may be summarized as follows: the CMM enhances respectively reduces naturally occurring processes so that the processes of soil structure forming are modified. Gradually, water uptake and storage efficiency are improved through this structural change. The present work allows the reconstruction of the underlying processes of this change in the soil water balance.

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