EFFECT OF TWO FARMING SYSTEMS ON AGROPHYSICAL PROPERTIES AND ORGANIC CARBON SEQUESTRATION IN WATER-STABLE AGGREGATES OF LOAMY SAND ORTHIC LUVISOL

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The objectives of the studies were to: evaluate the effects of organic (1) and mineral (2) farming system (FS) on the parameters of the loamy sand Orthic Luvisol agrophysical state and one the degree of organic carbon sequestration in water-stable aggregates (WSA). The FS1 was applied in a crop rotation including potato, spring barley, red clover and winter wheat with manure compost application at a rate of 33 t ha^{-1} once every three years. The FS2 was applied in a crop rotation with winter rape, winter wheat and spring barley with mineral fertilizer application. The application of FS1 as compared to that of FS2 resulted in a significant increase in total soil organic carbon content (SOC), basal respiration, nitrous oxide emission and total amount of WSA. The degree of organic carbon sequestration (as a ratio of SOC content in water-stable aggregates to SOC content in bulk soil) was equal to 0,9–1,5 in FS1 and FS2. The highest total amount of WSA was observed in soil of organic FS at the degree of organic carbon sequestration of 1,25. An increase of the degree of organic carbon sequestration in soil of mineral FS from 0,9 to 1,5 did not result in any increase of total amount of WSA.

Keywords: soil, farming systems, organic matter, sequestration, aggregation, nitrous oxide emission.