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The effects of aggregate structure on porosity and hydraulic properties of two silt loam soils of different origin

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The aim of the work was to determine the effect aggregate structure and aggregate size of two silt loam soils on pore size distribution, water infiltration, hydraulic conductivity (K) and diffusion coefficient (D). According to FAO classification the soils are classified as Eutric Fluvisol and Haplic Phaeozem. Standard water retention curves were used to calculate the derivative curves of pore size distribution (PSD) for bulk soil and soil aggregates. The derivative PSD curves showed that pore structure of the soils is hierarchical with matrix and secondary domains. The peaks in matrix domain on the PSD curve were of greater magnitude in untilled than tilled plots whereas the inverse was true with respect to structural domain. The cumulative infiltration was positively correlated with areal porosity as derived from resin-impregnated blocks and with flow active (stained) porosity. The closest correlation was obtained for most upper soil layers. The shape of water retention curve influenced both K and D of soil aggregates. The values of K and D for aggregates of $>$1 mm and $<$ 1 mm are substantially different. In general aggregates $<$ 1 mm are characterized by greater K and D in a wide range of soil water contents except of extreme water contents below 15 % v/v and above 35 % v/v. The differences in porosity and hydraulic properties between the two soils were observed.