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Field experimentation on preferential water flow in irrigated soil of Saratov region

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Classical concepts of water flow in soils consider the soil pore space as heterogeneous capillary media composed of pores with large range of pore radius, in which water forms one single hydraulic continuum. However, many field observations have demonstrated that water flow in soils rarely follows the predictions based on these classical concepts. In some cases water flows through the soil via preferential paths, bypassing large volumes of the soil matrix. From practical point of view this reduces the availability of water and nutrients for plants and causes accelerated transport of agrichemicals applied at the surface.

In the frame of INTAS-Food 2000-436 project special field experimentation has been carried out in Saratov Irrigated Area of Russia on a Bruni Soil with aim to investigate preferential flow in soils under irrigation. This type of soil has a heterogeneous pore space that represents a challenge for preferential flow study and modeling. During field experimentation, TDR-probes have been used for the borehole scanning as well as tensiometers to monitor water pressure head during and after infiltration.

The main tips of qualitative analyze underline that the main hypothesis of preferential flow in upper layers of the soil is mostly correct. .Gathered field data coupling to parameters obtained in laboratory is used to validate preferential water flow model.