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Change in the humus content of solonetz soils affected by human activities

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In Russia solonetz and solonetzic soils occupy 30.8 mln hectares. Depending on geographical and climatic conditions their share in the soil cover is varying from several to 80-90%. At the end of the XXth century above 50% of area covered by solonetz soils have been ploughed in Russia. As the virgin solonetz soils are low in fertility, so amelioration measures help increasing their productivity. One of such measures is a deep plowing resulted in destruction of the solonetz horizon and improvement of water-physical and agrochemical properties of these soils. It is evident from numerous investigations that the plowing and deep plowing in particular causes a decrease in the content of humus within the root layer. The data about changes in the humus content of improved solonetz soils taken place for a long period of time are scarce, in most cases the experiments continued only 5-10 years. The given paper is aimed at studying regular changes in the humus content of the agrogenically-modified steppe solonetz soil within the dry-steppe zone induced by different tillage techniques during 25 years of the experiment. Under study was the effect of three tillage techniques: moldboard plowing at a depth of 25-27cm, three-layered plowing at a depth of 40-45cm and trench plowing at a depth of 50-55cm. Soil sampling was made in the year of trial establishment, 10, 14 and 25 years later. The samples were taken every 10cm to the depth of 20cm in 10-5 replications, in laboratory the humus content (%) was defined by Tiurin's method. Reliable differences between experiment variants and years of observations in each variant were estimated by using St'yudent criterion at P=0.95, n=10 and tests Mann-Whitney U and Wilcoxon. It is worth emphasizing that in the first year of plowing the humus content became drastically dropped in the upper horizon in all the experiment variants as compared to the virgin solonetz soil. Trench plowing

induced especially intensive change in the humus content, the lower horizons revealed even its increase. Under the impact rendered by tillage technique the humus content was changed to a considerable extent in the upper 0-10 and 10-20cm horizons only in the first years of plowing. After 10 years the differences were observed only in the 0-10 layer and there were no reliable differences after prolonged plowing in all the experiment variants. The change in the humus content of soil became stabilized after 10 years of agricultural use and 20 years later it was equal to initial level.