

ESTIMATION OF CHERNOZEM MOISTURE RESERVES UNDER SOIL TILLAGE MINIMIZATION

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Moisture is an important soil characteristic related directly to crop productivity. The purpose of the work was to study the effect of soil protective tillage systems on the changes in the total and productive moisture reserves in ordinary chernozem. The study was carried out in the production experiment of Dary Malinovki LLC (Sukhobuzimskiy district) in the Krasnoyarsk forest-steppe, located within the Chulym-Yenisei denudation plateau in the South-Western outskirts of Central Siberia (56°10'N, 91°47'E). The observations were carried out in the fallow-spring wheat crop rotation. The scheme of the experiment is represented by the following treatments: 1. moldboard plowing to a depth of 25–27 cm; 2. minimal tillage (surface disking); 3. flat-cut tillage (cultivation). The reserves of total and productive moisture in the chernozem were estimated under the conditions of the transition to the soil-protective tillage technologies. The amount of precipitation did not have a direct impact on the value of productive moisture reserves. The total moisture reserves in the soil of the studied treatments had a strong positive correlation with the productive moisture reserves ($r = 0.79–0.98$). Statistical relationships were calculated between the reserves of productive moisture and the degree of soil compaction ($r = 0.57–0.75$), as well as air content ($r = -0.48–0.82$). The reserves of productive moisture in both studied layers of the soil under the conditions of fallowing were characterized as satisfactory, and in the soil under the crops of spring wheat on the background of precipitation deficiency – as unsatisfactory. In the conditions of precipitation lack, the use of flat-cut tillage resulted in a statistically significant increase in moisture reserves compared to the other two treatments. The studied soil layers 0–10 and 10–20 cm differed significantly in moisture reserves. During the studied period, the reserves of soil moisture available for plants in the 10–20 cm layer significantly exceeded its reserves in the surface layer.

Keywords: soil protection technologies, general and productive moisture reserves, moisture availability.