«The impact of the methods of primary tillage on the biological activity of ordinary chernozem»

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Obtaining high stable yields of agricultural crops with the maximum possible reduction of the cost of their cultivation while maintaining soil fertility is a priority task of modern agriculture. One of the main ways to solve it is to improve the tillage systems in the direction of reducing energy consumption and reducing the negative mechanical impact on the soil. Microorganisms as part of the terrestrial ecosystem occupy a key position in the flow of energy and the cycle of nutrients, determine the biochemical potential of the soil. Microorganisms and their metabolites allow early diagnosis of any environmental changes, which is important when predicting changes under the influence of natural and anthropogenic factors, control over the state of soil microflora is a necessary condition for the maintenance and reproduction of fertility when developing new technologies in agriculture.

In this regard, when evaluating various methods of primary tillage, it is important to identify their influence on the biological activity of the arable layer.
Solution methods

- Microbiological and biochemical studies were conducted in 2013-2015. In field experience laid in 2003 in a five-field grain-pair crop rotation with the following crop alternation: pure steam, winter wheat, soybean, spring wheat, barley in spring wheat crops in the experimental fields of the department of agriculture, soil science, agrochemistry and land cadastre of the Samara State Agrarian University. In order to comprehensively study the long-term minimization of tillage, where three variants of basic tillage are studied. The soil of the site is ordinary chernozem, medium heavy loamy medium humus. Spring wheat in crop rotation is cultivated according to the following main tillage options:

  1. Plowing at 20-22 cm;
  2. Bezotvalny loosening on 10-12 cm;
  3. No till

- The following indicators of soil biological activity were determined: biogenicity, cellulose-decomposing activity, degree of decomposition of plant residues, enzymatic activity.
When studying the feasibility and effectiveness of various methods of primary tillage, there was a positive effect of zero tillage on the growth of actinomycetes, and, on the other hand, a decrease in the number of soil fungi, which can be attributed to the deterioration of aeration of subsurface soil layers. The decrease in the number of fungal microflora led to a decrease in the level of cellulose-decomposing activity and slowing down the decomposition of plant residues in the variant with zero treatment, while the indicators of enzymatic activity show a possible, positive effect of zero treatments on the stabilization of organic matter in the soil.
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