EFFICIENCY OF THE APPLICATION OF MINERAL FERTILIZERS IN THE RESOURCE-SAVING METHOD OF SOWING CORN ON ERODIZED SOILS

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Abstract

The article provides data that this ridge-furrow method of sowing corn with a single application of nitrogen fertilizers reduces the number of treatments, has soil protection value, helps to preserve soil fertility, reduces its washout, and leads to an increase in yield. For the first time for the conditions of irrigation-eroded soils of the Samarkand region, a method and rates of nitrogen fertilization have been developed for ridge-furrow sowing of corn.

Keywords: fertilization, soil protection, resource saving, soil density, ridge-furrow sowing method, soil washout.

Introduction

Soil-saving and resource-saving farming has become very popular and very practical for farmers, especially in the works of FAO are widely studied and recommended [3, 4] and also studied by many authors of work on no-till [5] problems and solutions technology of cultivation and harvesting of forage crops [2] ...

The current market economy delivers stringent requirements for the production of high-quality, low-cost and competitive agricultural products, therefore resource-saving and environmentally friendly agricultural technologies are of particular importance.

In solving the problem of increasing the efficiency of agriculture, an important role is played by the improvement of methods of soil cultivation in the cultivation of agricultural crops. The soil cultivation system currently used in the farms of the republic, based on annual plowing and the use of single-operation tools, is high-cost and entails such negative consequences as destructuring, degradation of humus, imbalance of agronomically significant chemical and physical properties, loss of biogenicity, productive moisture. Therefore, the purpose of choosing a cultivation method should not be the maximum yield at any cost, but the minimum costs per unit of production with the greatest economic effect and preservation of soil fertility. As the latest advances in science and practice have shown, this can be achieved by minimizing the main tillage, using combined machines and tools that ensure the simultaneous execution of a number of technological operations.

An important factor limiting the use of minimum tillage in the farms of the republic is its multivariance and the inability of many specialists to choose the optimal one for specific conditions. To determine the possible level of minimization of soil cultivation, it is necessary to take into account a set of factors: the type and granulometric composition of the soil, the content of organic matter in it, the density, the ability of the soil to maintain and restore the structure, drainage, weediness, precursor, responsiveness of the cultivated crop to the doses of fertilizers, pesticides, and etc. Only with a deep comprehensive analysis, the minimum tillage of the soil allows you to preserve moisture, increase fertility, reduce costs and obtain yield. The use of zero technology (no-till) in small field plots may not achieve the expected results even more than 25 years of research [7]. Since the microclimate and nutritional conditions may not be the same as naturally, it is as in industrial conditions. Recently, in the agriculture of Russia and other countries, the interest in zero tillage toist on no-till technology has been increasing significantly [6, 8, 9].

Soil compaction occurs under the influence of natural factors - rain, irrigation, especially in the absence of vegetation cover, gravitational forces, as well as the mechanical effect of the running system of tractors, combines, tillage machines, means for introducing organic and mineral fertilizers into the soil.

As the power and mass of agricultural machinery increased, the negative aspects of mechanical tillage began to appear to a greater extent, the contradictions between its agrotechnical necessity and the negative impact on fertility increased, manifested, first of all, in the strengthening of the erosion-dangerous state of the soil and its overcompaction to a great depth.

Minimum tillage, according to MN Zaslavsky [1], on eroded soils is necessary to preserve the humus content and potential fertility.

Materials and methods of work. In our experiments, we compared different methods of sowing corn on eroded meadow-sierozem soils. It is known that the specificity of irrigated agriculture is the need for constant cultivation of the topsoil after each irrigation. In corn growing during the growing season, the soil is cultivated 3-5 times. Treatments include cultivating and cutting irrigation furrows, while applying mineral fertilizers in the form of top dressing. If we add to this plowing, milling, harrowing and machine harvesting, then the number of passes of the unit along the same track increases significantly. Scientists note that after the simultaneous passage of the tractor into a wetted field, the topsoil is compacted to 1.52-1.60 g / cm3, against 1.34 in the initial state.

With the ridge-furrow method of sowing corn and a one-time application of nitrogen fertilizers, it reduces the number of treatments, has a soil-protective value, helps to preserve soil fertility, reduces its washout, and leads to an increase in yield.

Research result. The data obtained as a result of the research, with the dotted wide-row and the new ridge-furrow method of sowing corn, indicate that when conducting inter-row

treatments after the first and second irrigation in variants with dotted sowing, the soil is compacted, by periods by 0.1-0.2 g / cm3.

With the ridge-furrow sowing method, it is not possible to carry out inter-row cultivation, since the plants are located on the ridge, on the sides and at the bottom of the furrow. In connection with the transition to a one-time, pre-sowing application of an annual dose of nitrogen fertilizers at two depths and due to their combination with a slow-acting fertilizer (SI), there is no need for top dressing. As a result, the reduction of processing and the passage of units through the field, significantly saves fuel (POL) material. This naturally has a positive effect on the cost of manufactured products.

In the area of the location of the bulk of the roots, starting from a depth of 20-30 cm, there is a noticeable increase in the bulk soil mass to 0.07 after the first and to 0.15 g / cm3 - the second irrigation with the dotted sowing method. At the end of the growing season, the difference is somewhat smoothed out and is 0.07 g / cm3.

The effect of the passage of aggregates on the soil density increases at a depth of 50 cm in the layer, where it noticeably increases over the years.

It is known that an increase in the density of addition of the arable soil horizon to 1.5 g / cm3 causes not only deterioration of its physical properties, but also inhibits the activity of microorganisms and sharply reduces the crop yield.

The change in the volumetric mass of the soil with different methods of corn cultivation, depending on the amount of processing, is shown in table -1.

Table 1. Dynamics of the volumetric mass of soil with different methods of sowing corn (g / cm^3)

Soil layer	With the usual - dotted sowing method				При гребне-бороздовом способе посева			
	Doposeva	After 1 watering	After 2 watering	At the end of the growing season	Before sowing	After 1 watering	After 2 watering	At the end of the growing season
0-10	1,14	1,21	1,22	1,24	1,15	1,22	1,23	1,24
10-20	1,28	1,37	1,39	1,40	1,28	1,38	1,39	1,40
20-30	1,41	1,46	1,57	1,54	1,39	1,40	1,42	1,47
30-40	1,45	1,55	1,57	1,60	1,46	1,48	1,49	1,49
40-50	1,48	1,54	1,55	1,57	1,46	1,48	1,49	1,51
50-60	1,53	1,55	1,56	1,57	1,52	1,52	1,53	1,55

The problems of preventing soil erosion have been studied by many scientists, these works are devoted to the features of the manifestation of irrigation erosion, the development of ways to increase fertility, optimize tillage, identify the best furrow length and water jet at various slopes.

In our research, sowing methods have a significant effect on the size of soil erosion when irrigated over furrows. The volume of solid soil runoff with waste water with the ridge-furrow

sowing method decreased compared to the dotted one.

The increase in the difference in the volume of soil washout from the first to the third irrigation, in our opinion, is associated with the development of the root system of plants located at the bottom of the furrow during ridge-furrow sowing.

Conclusions

Based on the above materials, we can say that the practical value of this work. consist in the fact that in conditions prone to erosion of soils, recommendations have been developed on the doses and timing of nitrogen fertilization for the ridge-furrow method of sowing corn.

The ridge-furrow method of sowing corn is an effective means of protecting soil from erosion, allowing to reduce washout, loss of nutrients, in comparison with the dotted one by 4-5 times, and also due to the rational use of the feeding area, it creates an opportunity to increase the density standing of plants, provides an increase in productivity.

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