

STUDYING THE EFFECT OF SOD-HUMUS SYSTEM TO SOIL MICROFLORA OF
ROW AISLES OF APPLE ORCHARDS OF TASHKENT REGION

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ABSTRACT.

The article presents findings characterizing the effect of various grass mixtures on soil fertility and microflora of the soil (the number of beneficial bacteria). It was established that, the grass mixtures used for mulch in the row aisles of the orchard, have a positive effect on the alteration of soil conditions.

Key words: *fertility, soil, microorganisms, grass mixtures, mulching, bacteria.*

INTRODUCTION:

The main reason for the low productivity of orchards in the farms of the republic is the extremely limited use of organic fertilizers in orchards according to the results of scientific researches, as well as a generalization of production performances. Namely, organic element is the main source of soil humus fertility.

No tillage work is held for many years, when sod-humus soil system is applied. It is known that, regular cultivation of the soil leads to the destruction of the humus layer, systematic damage to the roots, and generally excludes the possibility of their habitation in the upper horizon, the richest in nutrients. Thereby, the sod-humus system technology attracts special attention of domestic and foreign farmers.

The point of the matter, perennial grasses are sown in between rows of orchard, after they are periodically (4-5 times per summer) mowed and used as mulch. The herbaceous layer improves aeration of the soil due to root moves, mineral nutrition due to mineralization of dead grass roots and water balance as a result of the enrichment of the soil with organic material. These favorable conditions are formed not immediately in the soil, but at the 3-4th year after sown. In the starting years, when turf formation is initiated, trees may be lacking in assimilated nitrogen and water in connection with the consumption by grasses. The application of fertilizers, chiselling and leveling the soil are necessary for reducing the period of formation of the sod and to prevent the growth of trees from stopping due to long-term soil-sod accumulation in the soil.

The competition between grasses and trees for water and nutrition is compensated by mowing grasses repeatedly, increasing doses of nitrogen fertilizer (3-4 fold) in early spring, applying foliar urea. The requirements for sowing herbs for long-term sod accumulation should be high, while cereal-legume mixtures are sown. Grass growth is regulated by mowing. Overgrown grass intensify the competition for the nitrogen and moisture with the tree, where, excessive mowing inhibits growth of grass. The cereal – bean mixture should be mowed at a length of 10 cm [1,2].

Long-term sod accumulation restores the soil structure and improves soil properties, and also increases the propagation of beneficial microflora in the soil, and the number of beneficial bacteria increases. The bark of trees becomes more resistant to damage caused by various diseases.

Living microorganisms (bacteria, fungi, algae, actinomycetes) and other simple organisms (flagella, ciliates, worms) are an essential component of soil biota during the process of humus formation. They destroy

dead plant residues, some part of which is fully mineralized, and mineralization products are absorbed by plants, and the other part goes into the form of humic substances.

The microbiological feature of soils is extremely important, since it allows one to find out the influence of agricultural technologies of crop cultivation on the biological properties of soils. The results of microbiological studies give an idea of the features of microbiological processes occurring in specific soils - i.e. factors necessary for predicting soil fertility and the effectiveness of agricultural technologies. The microbial population is the functional core of biogeocenosis, which plays the most important role and maintains the circulation of substances and energy [5].

Soil microorganisms are highly sensitive indicators that reflect any slightest changes in the soil. Fertile, “healthy” soil is characterized by a dynamic balance of a certain quantity of soil and the quality of effective microorganisms.

The significance of soil microorganisms is very high in increasing soil fertility and crop productivity. The soil acquires the properties of a living system thanks to microorganisms. Microorganisms provide restoration of soil fertility, prepare the nutrient medium and transfer it from the soil solution to the root system, reprocess the flora and fauna into useful soil components. Therefore, attention should be paid to soil microflora for improving the technology of cultivation of crops [6].

METHODS:

Microbiological analyzes of soils were carried out according to generally accepted methods in soil microbiology according to Zvyagintsev D., 1991; Jozef Segi, 1986; G. L.Seliber, 1962 [3,4,7]. Quantitative analysis of the main agronomical important, ecological-trophic groups of soil microorganisms, which involved in the metabolic cycles of nitrogen, phosphorus, potassium and other trace elements in the soil: ammonifiers, oligonitrophils, phosphobilizing bacteria, actinomycetes and micromycetes, phase I and I nitrifiers, butyric acid bacteria, cellulose decomposing, aerobic and anaerobic bacteria in the arable soil layer (0 – 2 cm) is included in the microbiological monitoring.

RESULTS:

The number of ammonifying bacteria in grass mixtures was $4,5 \times 10^7$ - $7,5 \times 10^6$ CFU/g soil, in bare fallow $2,0 \times 10^7$ CFU/g soil; oligonitrophilic bacteria in the grass mixtures $4,5 \times 10^5$ - $5,2 \times 10^5$ CFU/g of soil, in the bare fallow $2,2 \times 10^5$ CFU/g of soil. The highest number of phosphobilizing bacteria was found in grass mixtures $4,5 \times 10^7$ CFU/g; in the bare fallow they are amounted to $2,2 \times 10^6$ CFU/g of soil (table 1).

Table 1.
The number of agronomical important groups of microorganisms in the soil samples

Samples	Horizontal layer, cm	Ammonifier bacteria	Phosphobilizing bacteria	Oligonitrophils	Nitrifier bacteria	Micromycetes	Actinomycetes
Bare fallow	0-20	$2,0 \times 10^7$	$2,2 \times 10^6$	$2,2 \times 10^5$	Not identified	$1,5 \times 10^3$	$1,5 \times 10^5$
Clover Red+ cereals	0-20	$7,5 \times 10^5$	$4,5 \times 10^6$	$4,5 \times 10^5$	$1,5 \times 10^4$ (Azotobacter vinelandi)	$7,5 \times 10^4$	$7,5 \times 10^4$
Clover white + cereals	0-20	$4,5 \times 10^7$	$4,5 \times 10^6$	$2,7 \times 10^6$	$1,5 \times 10^4$ (Azotobacter vinelandi)	$7,5 \times 10^3$	$2,2 \times 10^5$

					7,5x10 ⁴ (Azotobacter chroococcum)		
Cereals	0-20	7,5x10 ⁶	4,5x10 ⁷	5,2x10 ⁵	Not identified	7,5x10 ³	7,5x10 ⁴

The study revealed that, under the influence of mulch, the propagation of beneficial microflora in the soil increases. The use of various agricultural technologies in the cultivation of crops causes changes in the functioning of the soil, primarily microflora, since microorganisms are extremely sensitive reactants to changes in the environment.

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