



**SOIL STRUCTURE AND CHANGES IN THEIR PHYSICAL PROPERTIES
UNDER THE INFLUENCE OF EROSION PROCESSES**

<https://doi.org/10.5281/zenodo.10156350>

O. Abdieva

Associate Professor of Namangan State University

ABSTRACT

As a result of the study, the different effects of different forms and rates of phosphorus fertilizers based on Zarafshan phosphorites on the assimilation surface of leaves, an increase in leaf area in one plant and hectare were determined when using ammonium polyphosphate and liquid complex fertilizer ZHKU grade 10:34:0. In a low background of soil fertility, the assimilation surface of leaves in the ammonium polyphosphate variant was higher by 20.1% compared to the control, in an average background of soil fertility - by 11.3%, net photosynthetic productivity - by 15.5%, when ammonium polyphosphate was added and liquid complex fertilizer.

Key words

corn, fertilizer, phosphorus, orthophosphate, culture, yield, productivity, polyphosphate.

Introduction: In the world, when growing corn as a main and secondary crop, by improving the phosphorus nutrition system, optimization of the balance of nutrients in the soil is achieved, obtaining a high yield of grain and green mass, providing the population with food, industry with raw materials and animal husbandry with complete (nutritious) feed. In this direction, scientific research is relevant to study the impact of the use of new fertilizers developed on the basis of phosphorites together with nitrogen and potassium mineral fertilizers on the growth, development and yield of corn, as well as the development of optimal technology for their use.

In the Republic of Uzbekistan in 2018, when placing agricultural crops for corn, as a valuable grain and fodder crop, 138.5 thousand hectares of land will be allocated and for the first time it is planned to produce 1210.9 thousand tons of corn grain. Currently, in the Republic the average grain yield of corn is 35-45 c/ha.

Literature review

In the experiments of K.M. Telikh [8; p-18] the yield of corn for silage and grain with various anti-erosion measures was obtained higher than in the control (irrigation in furrows without anti-erosion measures). For example, compared to a



yield of 23.1-27.5 t/ha for green mass and grain of 6.86-8.16 t/ha (on control), the yield in options using polymers on irrigation along the highest slope, contour irrigation and in double furrows the results were correspondingly higher, i.e. 28.98-29.52 t/ha, 32.08-33.76 t/ha, 27.2-28.01 t/ha of silage. Data from these silage harvests indicate that soil erosion control techniques tested on irrigated plots turned out to be more effective than traditional irrigation methods at the highest slope.

One of the methods for increasing the growth, development and productivity of various agricultural crops and increasing the fertility of eroded soils is the use of mineral and organic fertilizers, taking into account the degree of soil erosion [6; p-122-126]. It is known that in the first periods of growth, agricultural crops absorb phosphates more intensively than in subsequent periods. Phosphorus starvation of plants in the early period of their growth causes such depression that it cannot be completely overcome even by normal subsequent nutrition [5; p-25-27]. Organomineral fertilizers, due to the biochemical activity of phosphate rock, increase its solubility and increase the content of mobile P_2O_5 in the soil by 1.4-1.7 times [7; p-140-144].

Research Methodology

The following biometric records were carried out: cob height, cob diameter, number of grains in a row, number of rows of grains in a cob, number of grains in a cob, number of cobs on one plant, weight of one cob, weight of 1000 grains, grain yield after threshing the cobs [2;c -278].

Yield data in field experiments were processed using the method of variance and correlation analysis according to B.A. Dospheov [1; p-416].

It has been established that eroded soils in the irrigated zone arise as a result of the influence of water erosion processes and bioclimatic conditions. The composition and properties of irrigation-eroded soils are influenced by relief, exposure, vegetation, hydrothermal and many other conditions.

Field experiments were carried out in accordance with the methodological guidelines for conducting field experiments with fertilizer on eroded soils and agrochemical mapping, as well as those developed by the Union of Scientific Research Institutes.

The research program covered the study of the growth, development and yield of corn when applying various forms and rates of phosphorus fertilizers.

For the technical solution "Reconstruction of the POU machine for gravity supply of liquid complex fertilizers" a certificate for rationalization proposal No. 01/92 dated February 2, 1992 was received.

The influence of phosphorus fertilizers on the productivity and grain quality of corn hybrid Korasuv-350AMV. The studies were conducted in 1998-2001. with

the zoned corn hybrid Korasuv-350AMV on washed-off and unwashed soils. The experiment was carried out in 4 repetitions, with a total plot area of 112 sq.m. and accounting - 86 sq.m. The objective of the study was to establish the influence of rates and forms of phosphorus fertilizers on the yield and quality of corn grain.

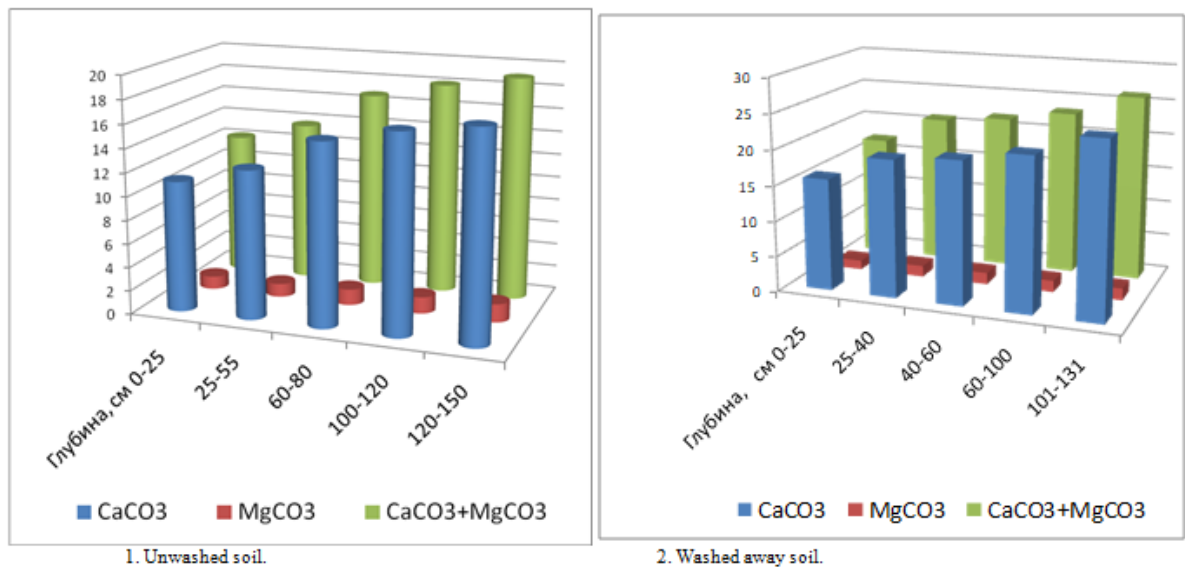
were carried out in accordance with the “Methodological recommendations for conducting field experiments with corn” and “Methodology for field experiments for studying agrotechnical techniques for cultivating corn” [4; p-225].

Experience system

Table 1

Some physical properties of typical gray soils (average of 16 sections), g/sm³

Layer depth, sm	Washed away		Unwashed	
	volumetric mass	specific gravity	volumetric mass	specific gravity
0,25	1,47±0,18	2,58±0,25	1,39±0,15	2,45±0,22
25-50	1,48±0,16	2,61±0,23	1,33±0,15	2,47±0,20
50-80	1,42±0,15	2,69±0,20	1,35±0,14	2,54±0,24
80-110	1,46±0,16	2,67±0,23	1,30±0,10	2,50±0,22
110-140	1,43±0,09	2,70±0,14	1,31±0,11	2,47±0,21
140-180	1,45±0,08	2,72±0,10	1,38±0,09	2,48±10
0-180	1,45±0,06	2,66±0,10	1,34±0,08	2,48±10



Pic.1. Carbonate content in typical gray soils depending on the degree of soil erosion.

Analysis and results

The determination of the assimilation surface of the leaves was carried out using the linear method by multiplying the greatest width of the leaf by its length and by a factor of 0.75.

To characterize the soil profiles of the foothill zone, a morphological description of soil sections on the washed away and unwashed parts of

automorphic and hydromorphic soils was carried out. As can be seen from the morphological description of automorphic soils on the upper parts of the slopes subject to erosion, the humus horizon is significantly shortened. Carbonate nodules measuring 1.5-2 cm are confined to the upper arable horizon ($13.9 \pm 2.3\%$). In the lower parts of the slope the soil is loamy, dark gray in color. Carbonate deposits begin at approximately a depth of 70-80 cm.

The soils of the upper and lower parts of the slope contain clearly different carbonate profiles (Fig. 1). In the lower part of the slope, the maximum amount of carbonates is contained in horizons of 80-180 cm, and in the upper part there is a high content of carbonates already from a depth of 20 cm.

On irrigation-eroded soils, the specific gravity, volumetric mass, porosity and other physical properties depend to a greater extent on the slope of the terrain, and as the degree of erosion increases, the volumetric and specific gravity of soils increases, which is associated with a more dense arrangement of soil particles on the washed-out part, as well as with a decrease in the content of organic substances and an increase in calcium and magnesium carbonates (Table 1).

Conclusion/Recommendations

In accordance with the increase in the volumetric and specific gravity of soils in the upper horizons, the porosity or porosity also changes, which decreases as soil erosion increases and reaches its lowest value in the upper horizons of washed away soils.

REFERENCES:

1. Доспехов Б.А. Методика полевого опыта (с основами статистической обработки результатов исследований). Москва: Колос, 1979, -С 416.
2. Методика полевых опытов по изучению агротехнических приемов по возделыванию кукурузы.- Москва, 1984, -С 278 .
3. Методика определения структуры урожая и качества зерна. Москва, 1989, -С 290 .
4. Методы полевых и вегетационных опытов с хлопчатником в условиях орошения. Ташкент: СоюзНИХИ. 1973. Изд-4, -С 225 .
5. Сулаймонов И. Ж. и др. REPETITIVE CULTIVATION OF SUGAR BEET SEEDS IS ASSOCIATED WITH THE SOWING OF PLANTING SEEDLINGS // Міжнародний науковий журнал Інтернаука. – 2018. – Т. 1. – №. 1. – С. 25-27.
6. Sulaymonov I. J., Ergashev D. INFLUENCE OF FORM AND NORMS OF NITROGEN FERTILIZERS ON THE DEVELOPMENT OF PAVORNO SUGAR



BEET //Scientific and Technical Journal of Namangan Institute of Engineering and Technology. – 2020. – Т. 2. – №. 9. – С. 122-126.

7. Sulaymonov I. et al. BEETROOT EFFECT ON THE TOTAL MASS OF SOIL //Scientific and Technical Journal of Namangan Institute of Engineering and Technology. – 2020. – Т. 2. – №. 2. – С. 140-144.

8. Телих К.М. Факторы влияющие на урожайность зерна кукурузы. // Кормопроизводство.2002. №5.-С 20-22.

9. Omonillo o'g'li X. A. AGROCHEMICAL INDICATORS OF THE SOIL DEPENDING ON THE STANDARDS OF MINERAL FERTILIZERS //Finland International Scientific Journal of Education, Social Science & Humanities. – 2023. – Т. 11. – №. 1. – С. 741-746.

10. Khabibullaev A. O. EFFECT OF MINERAL FERTILISERS APPLIED TO AMARANT PLANTS ON NITROGEN DYNAMICS IN THE SOIL //SCIENTIFIC ASPECTS AND TRENDS IN THE FIELD OF SCIENTIFIC RESEARCH. – 2023. – Т. 1. – №. 10. – С. 7-12.