Proceedings of International Educators Conference
Hosted online from Rome, Italy.
Date: 25th August - 2024
ISSN: 2835-396X Website: econferenceseries.com

SOME MORPHOGENETIC CHARACTERISTICS OF SOILS OF KONIMEX NATURAL GEOGRAPHICAL REGION

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Аннотация

Мақолада Конимех табиий географик районида кенг тарқалган тупроқларнинг айрим морфогенетик хусусиятлари қисқача мушоҳада қилинган. Қумли чўл тупроқларга нисбатан суғориладиган тупроқлар морфогенетик хусусиятлари, уларнинг биологик, кимёвий, физик-кимёвий ва агрокимёвий ва физикавий хоссалари ўзгарганлиги ижобий томонга ўзгариб, қишлоқ хўжалик экинларини ўсиши ва ривожланиши учун мақбул шарт-шароитлар яратилганлиги асосланган.

Калит сўзлар: Конимех табиий географик райони, автоморф, яримгидроморф ва гидроморф шароитдаги қумли чўл, суғориладиган сур тусли қўнғир, сур қўнғир-ўтлоқи ва ўтлоқи тупроқлар, морфогенетик хусусиятлари, унумдорлик.

НЕКОТОРЫЕ МОРФОГЕНЕТИЧЕСКИЕ ХАРАКТЕРИСТИКИ ПОЧВ КОНИМЕХСКОГО ЕСТЕСТВЕННО-ГЕОГРАФИЧЕСКОГО РАЙОНА

Аннотация

В статье кратко рассмотрены некоторые морфогенетические особенности почв, распространенных в природно-географическом районе Канимех. Он основан на том, что морфогенетические характеристики орошаемых почв, их биологические, химические, физико-химические и агрохимические и физические свойства изменились в положительную сторону по сравнению с песчаными пустынными почвами, созданы оптимальные условия для роста и развития сельскохозяйственных посевы.

ISSN: 2835-396X Website: econferenceseries.com

Ключевые слова: Природно-географический регион Канимех, песчаная пустыня автоморфные, орошаемые серо-бурые, серо-буро-луговые и луговые почвы полугидроморфные и гидроморфные почвы, морфогенетическая характеристика, плодородие.

SOME MORPHOGENETIC CHARACTERISTICS OF SOILS OF KONIMEX NATURAL GEOGRAPHICAL REGION

Abstract

The article briefly examines some morphogenetic features of soils common in the natural-geographical region of Kanimekh. It is based on the fact that the morphogenetic characteristics of irrigated soils, their biological, chemical, physicochemical and agrochemical and physical properties have changed in a positive direction compared to sandy desert soils, and optimal conditions have been created for the growth and development of agricultural crops.

Keywords: Natural-geographical region Kanimex, automorphic sandy desert, irrigated gray-brown, gray-brown-meadow and meadow soils, semi-hydromorphic and hydromorphic soils, morphogenetic characteristics, fertility.

Introduction

In the recent researches devoted to the processes taking place in the soils of the areas used for agricultural purposes in different regions of our country, the scale and influence of not only natural, but also anthropogenic factors are proven in scientific researches, and are specially recognized in the scientific publications of research scientists.

In particular, the morphology, agrophysical, water-physical, physical-chemical, chemical-biological and several other properties of the irrigated soils of our country have changed over several centuries [2; 548-552 p.]. In particular, in this regard, L.T. Tursunov [5; 248-p.] In the example of the gray-meadow soils of the Karysh desert, it has been proved that the morphology of these soils underwent the following changes under the influence of development: First of all, an arable layer is formed due to plowing of the land. In this layer, the natural morphological features typical for turf, sub-turf, and transient layers are combined to form new types of

morphological features. The process of irrigation accelerates the formation of humus in this layer, changes the color of the soil mass.

Changes in the soil cover occur in the 1st-2nd years of development and cause more complex changes with the beginning of the irrigation period: First, morphological changes, i.e., the A arable layer begins to develop instead of the A grassy and A under the grass layers, which are typical for the pale gray soils. The appearance of this layer itself is a major genetic change. Because, in this layer, a porous, good alternative air-water, water-nutrition and heat regime is formed in comparison to the turf and sub-turf layer. Secondly, as a result of irrigation, a gray color appeared, instead of a brown color, which is typical for light gray soils. The level of seepage waters when the irrigation period is 30-40 years, it rose up to 2-4 meters and approached the earth's surface, and it directly began to participate in the process of soil formation, and as a result, the development of the soil cover began to change. Soils developing in automorphic conditions gradually turned into semi-hydromorphic conditions, i.e. serozem-meadow soils [5; 248 p.].

In this regard, we aimed to study the changes in the morphogenetic properties of soils developed under automorphic, semi-hydromorphic and hydromorphic conditions, their direction and intensity level, which are widespread in the natural geographical region of Konimex district, and scientific research was carried out based on a number of tasks.

Research object and methods. Administratively, the "Madaniyat" and "H.Olimjon" massifs of Konimex district, Navoi region, geographically, sandy desert in automorphic conditions, semi-hydromorphic irrigated brown and brown-sur brown meadow and meadow soils in hydromorphic conditions were selected as the research object.

The field and laboratory-analytical analyzes carried out in the course of the research were carried out according to the generally accepted methodology in soil science "Guide to conducting chemical and agrophysical soil analyses during land monitoring» [4; p. 260] manual and instructions for conducting soil surveys and drawing up soil maps [1; 48-p.] performed on the basis.

Research results and their discussion. In the course of research, soil sections were placed in field conditions and their morphological records were written. Including:

"Madaniyat massif" 7-M section. Sandy desert soils.

A (0-2 cm) - light gray, the surface part is dry, sandy, fine powdery, not compacted soft, there are many plant roots, traces of insects are rare, the transition to the next layer is sharp - according to density;

A1 (2-22 cm) - light gray, the surface part is dry, sandy, fine powdery, less dense, plant roots are dense, insects and their nests and traces are rare, transition to the next layer is sharp - according to mechanical composition and density;

B (22-45 cm) - light gray, the surface part is dry, sandy, fine powdery, soft not compacted, plant roots are sparse, insects and their nests and traces are not found, transition to the next layer is noticeable - according to the mechanical composition;

BS (45-110 cm) - light gray, the surface part is dry, sandy, fine powdery, soft, not compacted, plant roots are sparse, insects and their nests and traces are not found.

4-M-section.. Irrigated grey-brown soils.

A_{ar} (0-35 cm) - dark field color, the surface is dry, sandy, large cross-section, less compacted, plant roots are sparse, few stones are found, many insects and their nests and traces are found, the transition to the next layer is sharp - structure and density according to;

A_{uar}(35-45 cm) - dark-colored, dry, sandy, large dusty, moderately compacted, plant roots are sparse, there are many traces and nests of various insects, the transition to the next layer is noticeable - it differs in structure, density and the presence of new wounds;

B1 (45-88 cm) - dark field color, low moisture, sandy, large-grained, soft not compacted, plant roots are rare, few insect nests, isolated from new biological wounds (10% of the layer) have white glasses CO_2 spots, transition to the next layer sharp - by joints;

B2 (88-125 cm) - dark, low moisture, light sandy, large-grained, strongly compacted, small amount (in 30%) of white glasses CO_2 stains from chemical fresh wounds, frequent cobbles and sandstones, to the next layer transition is noticeable;

C (125-180 cm) - dark-colored, low moisture, slightly sandy, large-grained, strongly thickened, small amount (in 30%) of white glassy CO_2 stains from new lesions, many stony inclusions are found.

2-M-section. Irrigated brown-meadow soils.

A_{ar} (0-28 cm) - dark field color, the surface part is dry, the bottom part is wet, sandy, fine-grained, not compacted, soft, plant roots are sparse, there are many insects and their nests and traces, the transition to the next layer is gradual - color, by structure and density;

A_{uar} (28-44 cm) - light field color, low humidity, sandy, fine-grained, less dense, plant roots are sparse, there are many traces and nests of various insects, the transition to the next layer is sharp - with color, structure, density and the presence of new wounds is different;

B1 (44-80 cm) - field color, very moist, slightly sandy, large-grained, soft, not compacted, plant roots are rare, there are many insect nests, worm excrement is clearly visible from new biological wounds, significant to the next layer - according to moisture ;

B2 (80-120 cm) - light-colored, very wet, sandy, large-grained, not compacted, half-rotted plant root remains are rare, very well worked with underground organisms, worm excrement is found, white glassy CO2 spots are present from fresh wounds, there are stones and sandstones, the transition to the next layer is noticeable - in terms of color, humidity and mechanical composition;

C (120-170 cm) - liquid color, very wet, sandy, large-grained, medium density, gypsum crystals are found throughout.

Massif named after H. Olimjon

Due to the fact that the soil covers occupy large areas, they are composed of various soil complexes, from which irrigated brownish brown soils were taken as the dominant soils. These soils are formed on the surface of Tertiary rocks, and the mechanical composition is light sandy and sometimes sandy.

Below, the morphological structure of **irrigated brown soils** is described on the example of studied sections in this massif.

4- X -section. Irrigated brownish brown soils, loamy, weakly saline, cultivated with wheat.

A_{ar} (0-35 cm) - yellow-colored, poorly moistened, slightly sandy, fine powdery, moderately compacted, half-rotted plant remains and roots are found, small stones are sometimes found in the joints, the transition to the next layer is sharp - according to its mechanical composition and density;

A_{uar} (35-45 cm) - yellowish, moderately moistened, sandy, small-grained, less compacted, traces of plants and insects are found, it is clear to pass to the next layer - according to its mechanical composition and new wounds;

B1 (45-105 cm) - yellowish, moderately moistened, slightly sandy, less dense, plant roots and semi-rotted roots and traces of underground animals are rare, gypsum new wounds are found, transition to the next layer is obvious - according to color;

C (105-220 cm) - brown color, moist, slightly sandy, with spots of less concentrated salts and gypsum crystals.

Since the selected soil type is located in the desert zone of the farm, the composition of the soil is light and sandy in the vicinity, and the irrigated brown soil had its effect on the formation of the mechanical composition. Sur brown soils are characterized by their tendency to secondary salinization when the groundwater level rises due to the richness of parent rock salt-retaining minerals.

The soil covers are composed of different soil complexes, from which the irrigated brown-meadow soils were singled out because they occupy large areas of land. These soils are formed on the surface of Tertiary rocks, and the mechanical composition is medium and light sandy, sometimes sandy. The morphological structure of the **irrigated grey brown-meadow soils** in the isolated and studied sections of the massif is described below.

13- X -section. Irrigated brown-meadow soils, medium loam, weak salinity, maize field.

A_{ar} (0-32 cm) - yellow color, slightly wet from the surface to the dry bottom, slightly sandy, small stones are found, lumpy, gypsum particles and roots are found, transition to the next layer is noticeable - according to density;

A_{uar} (32-52 cm) - yellowish, slightly moist, slightly sandy, with a small granular structure, moderately dense, living roots of plants are found, transition to the next layer - according to color and moisture;

B1 (52-115 cm) - gray, medium-moistened, medium-sandy, with a scattered disjointed structure, less compacted, few traces of underground animals, few roots and half-rotted roots, salt crystals are found, the transition to the next layer is sharp - according to color and moisture;

C (115-215 cm) - yellow sand, high humidity, medium sand, unconsolidated, less compacted, few rotten roots, salt stains.

Due to the fact that the agricultural areas are located in the desert zone, mostly brown soils are formed, and later underground seepage water has had its effect on the soil formation. These soils have turned into brown-meadow soils. It is observed that the formation of salinity in this area is related to the subsoil layers of the Tertiary Period.

1-X-section. Irrigated meadow soils are formed in conditions where the level of underground water, which actively affects the process of soil formation, is at 1-2.5 m.

Irrigated meadow soils are mostly found along the Zarafshan River. These soils were formed under the conditions of constant wetting of the soil profile, as a result of which they became hydromorphic grassland soils. Over time, the external morphological features of grassland soils were formed, and the flora characteristic of these soils also appeared. In addition, oxides and compounds of iron, aluminum, and manganese are formed in anaerobic conditions in the continuous hydromorphism process, i.e., in an overmoistened environment. The lower parts of the soil are brownish-brown in color, the high level of groundwater also causes secondary salinity.

1-X-section. Irrigated grassland soils formed on the second alluvial terrace of the Zarafshan river, consisting of alluvial deposits, a field planted with cotton.

A_{ar} (0-42 cm) - gray, weakly wet, sandy, weakly compacted, lumpy structure, plant roots and half-rotted root remains are found, transition to the next layer - according to mechanical composition and density;

A_{uar} (42-58 cm) - gray, wet, slightly sandy, lumpy, moderately dense, traces of plant roots and underground insects are found, transition to the next layer - according to its mechanical composition;

B1 (58-113 cm) - gray, wetter than the previous layer, slightly sandy, small lumps, rust spots are found, less dense, sometimes traces of plant roots and insects are found, the transition to the next layer is sharp - according to mechanical approximation, density;

C (113-200 cm) - gray, buff, medium sandy, dusty, weakly compacted, sandy stony inclusions are found, sometimes salt spots are visible.

The morphological composition of the soils of the Konimex natural geographical region, formed in the same deposits, was determined by comparative comparison (Table 1, Fig. 1).

Accumulative humus (A) layer thickness:
In sandy desert soils (A + A1 + B) – up to 1-2 cm;
In irrigated brown soils with a brown color - up to 28-35 cm;
Irrigated sur in brown-meadow soils - up to 28-40 cm;
It reaches 30-42 cm in irrigated meadow soils.

Table 1 Comparative morphogenetic description of the studied soils

No	Indicators	Sandy desert	Grey brown soil	Grey brown-meadow soil	Meadow
1	Humus layer thickness, cm	1-2	28-35	28-40	30-42
2	The depth to which humus color reaches, cm	20-25	35-45	40-53	42-58
3	Amount of humus in the humus layer, %	0,250-0,290	0,475-1,353	0,518-1,386	0,526-1,420
4	Humus in one meter layer reserve, t/ha	35,03-36,77	50,71-155,39	45,33-152,77	63,00-174,90

The thickness of the accumulative humus (A) layer formed in irrigated soils is also directly related to the agrotechnical activities carried out in the regions. It is also evidence of the development of agricultural culture in the areas where meadow soils are scattered, so this layer (A) is up to 42 cm thick.

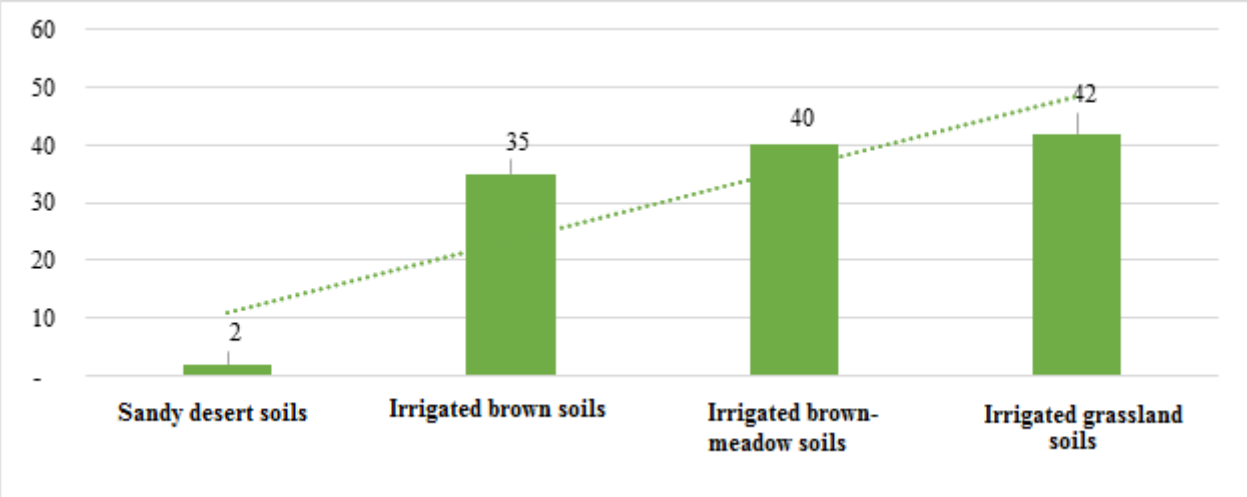

Figure 1. The studied soils have accumulative humus (A) layer thickness, cm.

Thickness of layer A + B:

In sandy desert soils (A + A1 + B) – 20-25 cm;

In irrigated brown soils with a brown color - 35-45 cm;

In irrigated brown-meadow soils - 40-53 cm;

It reaches 42-58 cm in irrigated meadow soils.

The thickness of this A + B layer shows the extent to which "anthropogenically altered" layers have been formed in different soils, and of course, this condition also determines the approximate relative age of the soils.

It was found that the studied irrigated brown brown soils are mostly "thin" (35-50 cm), and brown-meadow and meadow soils belong to the group with "thin" (35-50 cm) and "medium" (70-80 cm) thickness. .

According to the researches, as a result of frequent wetting of the soil cross-section under the influence of long-term irrigation, the mineral part of the soil undergoes the process of internal weathering, it creates the ground for the relative reduction of silica, calcium and sodium silicates in the upper and middle horizons of the cross-section, and on the contrary, the accumulation of magnesium and potassium oxides [G. Parpiev, 2021; p. 307].

In addition to the "anthropogenically altered" Ar-layer, the soils of the Zarafshon River, consisting of alluvial deposits scattered on the second terrace of the river, formed new rust-brown lesions (oxidized compounds of iron and manganese) in its lower layers (C - genetic horizon). , it is reasonable to interpret it as inherited from the mother.

According to the analysis of the amount of humus in the humus layer:

In sandy desert soils (A + A1 + B) – 0.250-0.290%;

In irrigated brown soils with brown color - 0.475-1.353%;

In irrigated brown-meadow soils - 0.518-1.386;

In irrigated meadow soils - 0.526-1.420% was recorded.

Compared to automorphic sandy desert soils, the humus reserve in one meter layer is increasing in cultivated hydromorphic soils. In turn, in sandy desert soils, the reserve of humus in a one-meter layer is about 72 t/ha on average, on average 198-206 t/ha in irrigated brown and brown-brown grassland soils, and 238 t/ha in irrigated grassland soils. , shows that irrigation depends on the formation, orientation and intensity of agricultural culture.

The regional concept of fertile soil formation shows that the gradual development of soils under the influence of natural and anthropogenic factors directly depends on biogeochemical processes, and the soils formed on different deposits in a certain region show special morphogenetic properties [G'. Parpiev, 2021; p. 307].
So, these cases were also proven in our research.

Conclusion, suggestions and recommendations

1. The regional concept of fertile soil formation shows that the gradual development of soils under the influence of natural and anthropogenic factors directly depends on biogeochemical processes, and the soils formed in different deposits in a certain region show special morphogenetic properties.
2. Compared to automorphic sandy desert soils, the reserve of humus in a one-meter layer of the soil of cultivated irrigated fields has increased by 3-4 times. In this process, it has been proven that irrigation is directly related to the formation, direction and intensity of farming culture.
3. In this process, the morphogenetic, biological, chemical, physico-chemical and agrochemical properties of the soils spread in the territory of the Konimekh district of the Navoi region, as well as the general physical, water-physical and physico-mechanical properties, changed in a positive direction, as a result, the growth and development of agricultural crops favorable conditions.

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