

CRITERIA FOR THE SEPARATION OF LOW-SOIL TAXON OF ARID ZONE SOILS OF AZERBAIJAN

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Abstract. The Azerbaijan soil are classified based on their genetic profile. The aim of the research was to obtain new information about the genesis, status, diagnostic features of the irrigated meadow-gray soils of the Azerbaijan Republic. In the article the morphological properties of the irrigated meadow-gray soils in the arid regions have been characterized.

The main objective of our study was to determine the criteria for the separation of lower soil taxa in irrigated meadow-gray soils. In soils, lower taxa are assigned in the following order: genus, species, species diversity, row and variant.

Keywords: *Irrigated meadow-gray soil, classification, genetic profil, diagnostic indicators.*

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1. Introduction

Classification is a crucial aspect of soil science. Like other fields, soil science has its own classification methods that have evolved over time. The key challenge in classification is identifying the most significant characteristics. Presently, there are two main schools of thought among modern researchers. Some researchers focus on the external characteristics of the soil, such as climate, relief and vegetation, while others prefer to examine the internal characteristics of the soil.

The initial classification of Azerbaijani lands was given by Zakharov (1927). Later, this classification was improved by A.N.Dimo, V.P. Smirnov-Loginov, V.R. Volobuyev, H.A. Aliyev and other scientists.

The soil classification of Azerbaijan consists of a system of eight unit types: soil class, department, type, subtype, genus, species, species diversity, range and variant.

The main criterion for separating classification units is the diagnosis of genetic soil layers (Babayev *et al.*, 2011; Babayev *et al.*, 2017).

Here, special attention is given to the morphological structure and chemical composition of the layers.

The classification of Azerbaijani lands requires improvement in connection with modern land development. The preparation of a modern land classification for Azerbaijan is a current requirement. The modern national land classification must

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comply with the land reforms carried out in the Republic. The main objective of our study was to determine the criteria for the separation of lower soil taxa in irrigated meadow-gray soils.

We put 5 cuts to determine the genetic diagnosis of soils in the dry zone selected as the object of study.

Table 1. Morphological structure of the soil profile of sections

Selection 10- 39°26'25.02"N, 48°36'28.07" E	
AYa'vca 0-20 cm	clayey, yellowish dark gray, lumpy granular, root, stem, large-cracked, with a lot of porosity, dry, clear passage, severe boiling.
AYa " cas 20-40 cm	clayey, yellowish light gray, calcareous structure, single-stemmed, salt and carbonate spots, weak moisture, severe boiling
A / BTcas 40-60 cm	clayey, yellowish light gray, calcareous, carbonate spots increased, moist, gradual, severe boiling
BTcas 60-80 cm	yellowish light gray, round-calcined, various salt residues are clearly selected, carbonate is spotted, moist, the passage is gradual, severe boiling
BTcags 80-105 cm	clayey, dark gray, bluish tinge, round, salt-carbonate-stained, humidity is abundant, gradual, severe boiling
BTcags 105-125 cm	light clayey, yellowish dark gray, round, carbonate, rust-stained, damp, gradual, severe boiling
B / Cca 125-157cm	clayey, yellowish dark gray, slightly clayey, soft-shaped, single-stemmed, salt-stained, high in moisture, gradual, severe boiling
C / cags 157-185 cm	soft clayey, light, yellowish-gray, light clayey, groundwater appears, its humidity is profuse, gradual, severe boiling.
Selection 15- 39°19'24"N, 48°24'36"E	
AYa'vzca 0-20 cm	heavy clayey, dark gray, calcareous-prismatic, very hard, root, stem, large small cracks, insect paths are clearly distinguished, medium, moist, clear passage, severe boiling.
AYa " vca 20-40 cm	heavy clay, dark gray, calcareous, solid, root, root, small cracks, damp, with a clear passage, severe boiling.
A / BTvca 40-62 cm	medium clayey, light gray, soft lumpy, soft-shaped, root-it is cocky, moist, its passage is gradual, it boils violently
BTca 62-88 cm	medium clayey, light gray, lumpy, soft-shaped, single-stemmed, moist, gradual, severe boiling
Btbakum 88-113 cm	fine sand, yellow, unstructured, soft root, root, moist, sharp transition, severe boiling.
BT / Ccakum 113-135 cm	soft sandy, yellowish, unstructured, soft - shaped, single roots, moist, sharp, severe boiling
C / ca135-167 cm	weak clayey, dark gray-yellow, sandy, clayey, single roots, moist, sharp, with severe boiling
Selection 20-39°24'28.99"N, 48°49'26.39"E	
AYa'vzca 0-18 cm	dark gray, small grained, soft, multiple root,the root, insect paths are clearly selected, the soil is weakly moist from the surface, the passage is clear, severe boiling.
AYa " vzca 18-44 cm	heavy clay, light gray, calcareous, solid, root, roots, insect paths are chosen clear, wet, the passage is clear, severe boiling
A / BTcag 44-75 cm	it is light clayey, with a bluish tinge, unstructured, soft, rust-stained, damp, the transition is clear, se ere boiling.
BTcag 75-105 cm	light clayey, straw-tinged, unstructured, very soft, rust-stained, stocky, moist, transient gradual, severe boiling.
BTcag 105-135 cm	slightly clayey, yellowish, unstructured, weakly caked, yellowish rust spot, moist, transitional gradual, severe boiling

C / cag 135-160 cm	clayey, yellowish-blue, calcareous, soft, rust-stained, single roots, moist, clear transition, very severe boiling.
Selection 25-39°25'53.75"N, 48°49'56.42"E	
AYa'vzca 0-17 cm	medium clayey, dark gray, granular, small-fissured, biologically functional, root, stocky, weakly moist, with clear passage, severe boiling.
AYa " vzca 17-41 cm	heavy clay, dark gray, calcareous, lumpy, medium root, plant root, moist, transitional, gradual, severe it boils.
A / BTcavg 41-72 cm	light clayey, granular, heap-like, soft, stocky, stocky, yellow, rust-stained, finely porous, moist, the passage is clear, severe it boils.
BTcavg 72-95 cm	sandy, yellow colour, unstructured, soft, yellow and blue rust spot, root, very moist, transition clear, severe it boils.
BT / Ccag 95-120 cm	light clayey, dusty, sandy, yellowish in color and bluish a lot of rust that plays is blotchy, unstructured, soft, roots, wet, transition clear, severe it boils
C / cag 120-157cm	clayey, yellowish-blue in color, calcareous, soft, with many rust spots, single roots, transition clear, severe it boils

The soil type known as Calcisols in the international soil classification is characterized by repeated carbonate accumulation (Feyziyev & Babayev, 2016). These soils form on calcareous rocks and are found in semiarid and arid zones. The Azerbaijan soil are classified based on their genetic profile (Salayev, 1991).

The classification of taxa based on the structural features of the soil profile is presented, suggesting the division of soils by genetic profile. Soil genetic profile includes horizontal layers of soil that differ in morphological and analytical indicators. Soil profile is formed as a result of interaction of genetic layers system and on its basis soil diagnostics and classification is determined. Soil diagnostics is studied as a result of field and laboratory studies of genetic layers.

The classification of taxa based on the structural features of the soil profile is presented, suggesting the division of soils by genetic profile. This approach allows for the consideration of all natural and anthropogenically altered soils in a single classification. This approach allows for the consideration of all natural and anthropogenically altered soils in a single classification.

The soil classification system in Azerbaijan comprises eight types of units: soil class, department, type, subtype, genus, species, species diversity, range and variant. It is important to note that the soil classification system used in our country is based on the principles of Russian soil classifications and the classification is done from a genetic perspective.

In soils, lower taxa are assigned in the following order: genus, species, species diversity, row and variant (Table 2).

Section 10. These soil profiles are carbonate-rich and of medium thickness (0-40 cm) according to the type taxonomy and are low in humus content. The presence of signs of clay formation at depths of 80-105, 105-125 cm and 125-157 cm, as indicated by the BTcags and C/cags, shows that they are clayey. These soils are medium-thick, low-humus, clayey soils according to the type taxonomy.

Table 2. Criteria for the separation of low-soil taxon of arid zone soils

Taxon	Seperation into taxa criteria	Sections			
		10	15	20	25
Genus	According to the calcareous of the soil profile	calcareous	calcareous	calcareous	Calcareous
species	According to the thickness of humus and cultured layers, cm	Medium thickness 0-40 cm	Medium thickness 0-40 cm	Medium thickness 0-44 cm	Medium thickness 0-41 cm
	According to the gleying of the soil profile	80-105, 125-157 cm gleyey soils	-	44-160 cm gleyey soils	41-157 cm gleyey soils
	According to the amount of humus in the humus layer of the soil, %	little humic	medium humic	medium humic	medium humic
species diversity	According to the granulometric composition of the soil	heavy clayey	medium clayey	clayey	heavy clayey
row	The thickness of the pomegranate soil layer, the depth of the soil layer from the soil surface to the soil-forming rocks	thick development profiled >185 cm	thick development profiled >167 cm	thick development profiled >160 cm	thick development profiled >157 cm
variant	Based on the land's cultivation status	Cultured	Cultured	cultured	Cultured
Final classification		<i>Cultured heavy clayey thick devolpoment profiled little humic gleyey medium thickness calcareous irrigated meadow-grey soils</i>	<i>Cultured medium clayey heavy clayey thick devolpoment profiled medium humic gleyey medium thickness calcareous irrigated meadow-grey soils</i>	<i>Cultured clayey thick devolpoment profiled medium humic gleyey medium thickness calcareous irrigated meadow-grey soils</i>	<i>Cultured medium clayey heavy clayey thick devolpoment profiled medium humic gleyey medium thickness calcareous irrigated meadow-grey soils</i>

They correspond to a heavy loamy granulometric composition. According to the order of taxonomy, these soils have a highly developed profile (>185 cm). The soils in this section are classified as cultivated soils, which are the smallest taxon. Therefore, the final classification is cement-gray soils with thick development profiles, low humus content and carbonate leaching.

Based on their diversity, they correspond to the heavy clayey granulometric composition. According to the order of the taxon, these soils have a well-developed profile (>185cm). According to the smallest taxon, the soils in this section are developed soils. Therefore, the complete classification of these soils is cement-gray soils with low humus content, medium thickness and carbonate leaching.

Section 15. According to the species taxonomy, the soil profile is calcareous. They are generally of medium thickness (0-40 cm) and moderately humus-rich

depending on the amount of humus. These soils are generally of medium thickness and medium humus content according to the species taxonomy.

They are medium loamy soils based on their variability. According to the series taxonomy, these soils correspond to a thick, well-developed profile (>167 cm).

According to the variant considered a small taxon, these soils are anthropogenic. Therefore, the final classification refers to moderately developed, middle-aged, thick humus carbonate leached chernozem soils

Section 20. The humus and cultivated layer thickness, based on species classification, is of medium thickness (0-44 cm). These soils are medium humus clayey soils of medium thickness based on species classification.

According to the classification by soil type, these soils are classified as moderately thick loamy soils with moderate humus content. Their granulometric composition is mainly clayey, depending on the variety. According to the order of taxonomy, these soils are suitable for a thick developed profile (>160 cm). These soils are classified as developed soils according to the small taxon. Therefore, the final classification is calcareous alluvial grey soils with thick development profiles, medium humus content, and medium thickness of leached horizon.

Section 25. The soil profile of this section is calcareous throughout. Based on the thickness of the humus layer and the developed horizon, the soil can be classified as having medium thickness (0-41 cm) and an A/BTcavg horizon (41-72 cm). Based on the thickness of the humus and the developed layer, the soil can be classified as moderately thick (0-41 cm), A/BTcavg (41-72 cm), BTcavg (72-95 cm), BT/Ccag (95-120 cm) and C/cag (120-157 cm) with a clayey texture at deeper depths and moderate humus content. These soils are moderately humus-rich, clayey soils of moderate thickness based on the soil classification (Mammadova, 2021; 2022).

They are predominantly heavy clay soils with some variation in type. According to the order of taxonomy, these soils are thickly developed profiled soils (>157 cm). Compared to the variant considered as a small taxon, the soils in this section are industrialized soils. They are classified as thickly developed, heavy clay, medium humus, medium thickness, carbonate washed, gray-brown soils.

2. Conclusion

Based on the latest soil classification of Azerbaijan, the national classification of irrigated meadow-gray soils in lower taxa (genus, species, species diversity, range, variant) has been clarified. They are designed for use in large-scale and precise soil surveys.

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