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AGCHABADI DISTRICT OF THE NEW GARADOLAG VILLAGE ADMINISTRATIVE AREA EARTH COVER STUDY

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ABSTRACT

It is known from the brief nature of the territory of the research district that the date of establishment of Agjabadi district 08.08.1930. The territory 1.76 thousand sq.m. km. Population 136.8 thousand people (January 1, 2020), population density 1 sq. km. km 78 people (January 1, 2020). Agjabedi district is located in Mil and Garabagh plains of Kur-Araz lowland. Agjabedi city and Sarvanlar, Kurds, Minakhorlu, Garavelli, Galabadin, Avshar, Muganli, Shahsevan, Koyuk, Tazakend, Khojavend, Salmanbeyli, AshagiAvshar, Hindarkh, Imamgulu-beyli, Mirzahagverdili, Sarijali, Balakhrizli, Taynaq, Poinag, Sharafkhanli, Shotlanli, Shenlik, Husulu, Ranjbarlar, Boyat, Hajilar, Garakhanli, Hajibadalli, Pariogullar, Agabeyli, Garadolag, Mehrabli, Kabirli, Aran, YeniGaradolag, Najaf-gulubeyli, Qiyameddinli, Shahsevan-Tazakand, Shahsevan-Tazakand, Includes Jafarbeyli and YukhariQiyameddinli villages. The relief of the region is flat, gradually rising from the north-east to the south-west. The surface of the area is composed of continental-alluvial and marine sediments of the anthropogenic system. There is a clay deposit. The climate is temperate hot, dry subtropical. The average temperature is 1.2-1.7 °C in January and 25-26 °C in July. Annual precipitation is 300-500 mm. The river network is sparse. The Kura River flows along the north-eastern border, and the Gargar River flows through the central part. The Upper Karabakh canal passes through the region. There is a salt lake in the area. Gray-meadow, gray, meadow-gray soils are widespread. In the central part, saline and saline soils are found. The plants are of steppe and semi-desert type. There are bushes and sparse Tugay forests on the banks of the Kura River. Animals: gazelle, wolf, wild boar, jackal, fox, swamp beaver, badger, gray rabbit, Asia Minor sand mouse, etc. Birds: turkey, pigeon, black grouse, pheasant, etc. Aggol National Park is located in Agjabadi district. Fifteen species of wild animals, 20 species of fish and 40 species of plants have been recorded here. Agjabadi is mainly an agricultural region. Fruit growing, cotton growing, grain growing, silkworm breeding, animal husbandry, etc. developed.

Keywords: Soil formation, soil cover, gray-meadow, light gray-meadow, heavy clayey, light clayey salinity, salinity, erosion.

INTRODUCTION

The establishment of Garadolag village is connected with the name of Garadolag tribe. In the 18th century, Panahali Khan moved some of the Garadolags to Karabakh as part of the Kangarli. As a result of the Kura flood in 1938, the Garadolags were relocated from the Kurkiragi areas where they settled to the area where they now live. Here they created Garadolag and then Yeni Garadolag villages. Garadolag village has an area of 32.7 square kilometers and a population of 3139 people. The main occupations of the population are agriculture and animal husbandry (Aliyev and Aliyev, 2004; Aliyev and Nurullayev, 2006).

MATERIALS AND METHODS

In accordance with the requirements of the existing agro-industrial grouping, in April 2017, a soil survey was conducted in the administrative territory of Yeni Garadolag village of Agjabedi district and the following was determined. The total area of the surveyed area is 2180.77 ha. Land survey works covered an area of 1802.75 hectares. The area is divided into the following natural areas:

Planting 1760.78 ha, Dinc 15.53 ha, Clean pasture 26.00 ha, Perennial plantings 0.44 ha and Other lands 378.02 ha (Aliyev and Aliyev, 2004; Aliyev and Nurullayev, 2006).

During the present study 82 sections were excavated in the area and morphological features were described in genetic layers. Soil samples were taken from the excavated sections and the following analytical-laboratory researches were carried out on them and the results were analyzed:

1. Hygroscopic moisture - by thermal method
2. Granulometric composition - by Kaczynski's pipette method.

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3. General humus - by the method of Tyurin
4. Total nitrogen - By calculation
5. Carbonate - With a calcimeter device
6. Absorbed Ca and Mg - by Ivanov method
7. Absorbed Na - by Hedroyts method
8. pH water suspension - with pH meter

Thus, based on the results of field soil research and laboratory analysis, a soil map was prepared on a topographic basis and a report was written. Archival materials were used in compiling the maps and writing the report. From the scale of Professor RH Mammadov in determining the granulometric composition was used.

RESULTS AND DISCUSSION

Natural conditions

Geographical position: The studied area is bounded on the north-west and north by Avshar village, on the east by Garadolag village, on the south-east by Mehrabli village, on the south by Kabirli village, on the south-west by Aran village and on the west (Mammadov, 2010; Shiyatov, 2000). Avshar and Aran villages of winter pasture No. 104 are bordered by territorial lands.

Relief. Relief, as a structure of the earth's surface, is directly involved in the formation of land cover as a factor in soil formation. It plays an important role in changing chemical and biological processes, hydrothermal regime and microclimate. Thus, the distribution of solar energy and atmospheric sediments is directly related to relief. The relief of the studied area consists of sloping and wavy plains (Garib and Mahmud, 2004 ; Mammadov, 2010).

Climate. Climate is one of the important factors as a factor in soil formation. Agjabedi district is located in the Kur-Araz lowland, in the western part of the Mil plain. The climate of the area is temperate hot semi-desert and dry steppes with dry summers, weak humidification is characterized by hot summers. The average temperature in January is 1.8 ^{0}C, the average temperature in July is 26 ^{0}C. The average annual relative humidity is 73%. The annual rainfall is 332 mm, mainly in spring and autumn. 980 mm of possible evaporation from the surface cover per year (Aliyev and Aliyev, 2004; Garib and Mahmud, 2004; Shiyatov, 2000). The average annual soil surface temperature is 18^{0}C (Table 1).

Table 1. Average monthly and annual information on climate indicators.

Met. station name	Climate indicators	Months												
		I	II	III	I V	V	VI	VII	VIII	IX	X	XI	XII	Annual
AĞCABADİ	Average temperature, ^{0}C	1.8	3.8	7.0	12.6	19.1	23.3	26	25.6	20.8	15.1	8.8	3.7	14
	Average surface temperature, ^{0}C	2	5	9	16	25	30	34	32	25	18	10	4	18
	Average humidity,%	84	80	77	72	68	62	60	64	71	79	82	82	73
	Precipitation, in mm	27	27	37	32	36	29	16	13	28	32	32	32	332
	Possible evaporation, in mm	23	28	44	71	106	147	176	156	104	62	35	28	980

Vegetation.

Vegetation is a key factor in the process of soil formation and the formation of soil cover. The increase in soil fertility with the formation of organic matter depends on the density of vegetation. Maintaining normal soil moisture, reducing the washing effect of water, preventing the formation and development of the erosion process are closely related to vegetation (Campelo *et al*., 2012; Rinn, 1996).

In the area we studied, we found sagebrush, wild clover, cattail, solid guramid, yellow flower, carnation, reed, yagtikan, invitation, meadow, etc. plants are widespread. Cultivated crops are also grown in the area.

Soil-forming rocks.

Soil-forming rocks affect the granulometric composition, chemical and mineralogical composition of the soil, causing the formation of soil profile and genetic layers (Aliyev and Nurullayev, 2006; Mammadov, 2010; Rinn, 1996).

The chemical composition of the parent rock plays an important role in the process of soil formation. The richer the parent rock, the better the quality of the soil formed on it. Thus, the soils of the area under study were formed on alluvial sediments.

Ground cover. According to the results of field soil research and laboratory analysis, the following soil types and subtypes are widespread in the area (Aliyev and Aliyev, 2004; Mammadov, 2010).

I. Gray-meadow soils
II. Light gray-meadow soils

I. Gray-meadow soils

Gray-meadow soils cover 761.47 ha or 34.92% of the total area, spreading to the west and east of the study area. These soils are due to their granulometric composition and soil layer thickness; 1) Divided into heavy clayey, thick, gray-meadow species.

To get acquainted with the characteristic morphological features of these soils, we give a description of section 29 excavated in the area. 0-23 cm gray, topavari, heavy clayey, solid, tubers and rhizomes, boiling, dry, the transition is clear. While 23-54 cm light gray, topavari, light clay, less solid, root residue, boils, slightly moist, the transition is gradual. 54-89 cm light gray, small clump, light clay, less solid, insect tracts, boils, less moisture, the transition is gradual. 89-127 cm grayish, small topavari, light clay, soft, rust spots, boils, less moisture, the transition is gradual. 127-156 cm straw, not selected, light clay, soft, carbonate stains, boiling, wet.

It is clear from the morphological description of the section that the color of these soils is gray in the upper layer, light gray and gray in the middle layer, and straw in the lower layer. The structure is not selected on the top layer, topavari and small topavari on the middle layer, and on the bottom layer. The granulometric composition was heavy clayey, and the length of the profile was wool the rose is clay. The density is hard on the top layer and less hard and soft on the bottom layers (Aliyev and Nurullayev, 2006; Garib and Mahmud, 2004).

Roots and rhizomes, root residues, insect tracts, rust and carbonate stains are found along the profile from new derivatives and marshes. These soils are boiled under the influence of 10% hydrochloric acid (HCl).

Humidity is dry in the upper layer, slightly moist in the middle layers, and moist in the lower layer. Transitions to genetic layers are clear and gradual throughout the profile.

According to the results of laboratory analysis, the granulometric composition of gray-meadow soils is heavily clayey. Thus, the amount of physical clay in these soils is 47.80-49.18% in the upper layers, and the profile length is 47.80-55.84% (Table 2).

The hygroscopic humidity of the main components varies between 4.1-5.3% throughout the profile. Total humus is 2.07-2.23% in the upper layers, and the profile length is 1.09-2.23%. According to the total humus, the total nitrogen content is 0.10-0.17%. The amount of carbonate is 10.69-13.68% throughout the profile. The pH in the water suspension is 8.20-8.33 units, which indicates that these soils are alkaline (Table 3).

The total amount of absorbed bases in gray-meadow soils is 28.40-32.95 mg. As a percentage, the Ca base is 62.08-63.74%, the Mg cation is 33.33-35.24%, and the Na cation is 2.68-3.17% (Table 4).

Table 2. Granulometric composition of gray-meadow soils (in absolute dry soil, in%).

Section №	Depth in cm	Particle size in mm, quantity in%						Physical clay%
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.005	0.005-0.001	<0.001	<0.01
1	2	3	4	5	6	7	8	9
1) Heavy clayey, thick, gray-meadow								
29	0-23	1,15	25,71	23,96	21,44	18,56	9,18	49,18
	23-54	0,65	21,23	24,64	22,48	19,76	11,24	53,48
	54-89	0,71	22,25	24,56	22,12	19,72	10,68	52,48
	89-127	0,84	25,40	22,40	20,36	17,84	13,16	51,36
	127-156	0,58	21,10	23,44	21,04	18,28	15,52	54,88
42	0-21	1,42	28,94	21,44	19,68	16,20	12,32	48,20
	21-52	0,70	20,06	25,44	23,36	20,88	9,56	53,80
	52-84	0,61	20,07	24,40	22,16	17,64	15,12	54,92
	84-130	0,58	17,70	25,88	23,36	18,28	14,20	55,84
	130-159	0,81	22,07	24,24	22,18	19,52	11,18	52,88
67	0-24	1,02	29,54	21,64	19,48	16,36	11,96	47,80
	24-60	0,71	22,41	25,84	23,12	16,88	11,04	51,04
	60-98	0,86	26,22	23,76	21,20	17,80	10,16	49,16
	98-131	0,72	21,00	25,40	23,16	18,64	11,08	52,88
	131-158	0,98	25,54	24,56	22,28	17,12	9,52	48,92

Table 3. The main components of gray-meadow soils (absolute dry soil, in%).

Section №	Depth in cm	Hiqros-kopik moisture	General		CO_2	To CO_2 according to Ca CO_3	pH watter suspension at the age of
			Humus	Nitrogen			
1	2	3	4	5	6	7	8
1) Heavy clayey, thick, gray-meadow							
29	0-23	4,7	2,23	0,17	5,45	12,40	8,20
	23-54	5,1	1,69	0,14	5,83	13,25	8,30
	54-89	4,9	1,19	0,11	4,89	11,12	8,27
	89-127	4,8	---	---	5,26	11,97	8,31
	127-156	4,2	---	---	5,64	12,83	8,33
42	0-21	4,6	2,07	0,16	5,83	13,25	8,28
	21-52	4,1	1,58	0,13	5,08	11,54	8,21
	52-84	5,2	1,14	0,11	5,45	12,40	8,26
	84-130	5,3	---	---	5,26	11,97	8,31
	130-159	5,0	---	---	6,02	13,68	8,33
67	0-24	4,5	2,18	0,17	4,89	11,12	8,20
	24-60	4,9	1,58	0,13	5,45	12,40	8,28
	60-98	4,7	1,09	0,10	4,70	10,69	8,26
	98-131	5,0	---	---	5,26	11,97	8,29
	131-158	4,6	---	---	5,83	13,25	8,32

Table 4. Amount of absorbed bases in gray-meadow soils (absolute dry soil, in%).

Section №	Depth in cm	Absorbed bases, in mg.ekv			The sum of the absorbed bases in mg.ekv	From the sum of the won bases, %-with		
		Ca	Mg	Na		Ca	Mg	Na
1	2	3	4	5	6	7	8	9
1) Heavy clayey, thick, gray-meadow								
29	0-23	21,00	11,00	0,95	32,95	63,74	33,38	2,88
	23-54	20,00	10,50	1,00	31,50	63,50	33,33	3,17
42	0-21	20,50	11,00	1,00	32,50	63,07	33,85	3,08
	21-52	19,50	10,50	0,85	30,85	63,20	34,04	2,76
67	0-24	18,50	10,50	0,80	29,80	62,08	35,24	2,68
	24-60	18,00	9,50	0,90	28,40	63,38	33,45	3,17

II. Light gray-meadow soils

Light gray-meadow soils cover 1041.28 ha or 47.75% of the total area, spreading to the north and south of the study area.

These soils are divided into the following types according to their granulometric composition and thickness of the soil layer.

2) Light clay, thick, light gray-meadow
3) Heavy clayey, thick, light gray-meadow

To get acquainted with the characteristic morphological features of these soils, we give a description of section 55 excavated in the area.

0-22 cm light gray, topavari, light clay, solid, root and roots, boiling, dry, clear transition. 22-55 cm light gray, topavari, light clayey, less solid, root residue, boil, dryu, the transition is gradual. 55-88 cm grayish, small clumpy, lightly clayey, less solid, vertical cracks, boils, less moisture, gradual transition. 88-122 cm grayish, small topavari, light clay, soft, rust stains, boils, less moisture, gradual transition. 122-155 cm straw, not selected, light clay, soft, carbonate spots, boils, less moisture (Aliyev and Nurullayev, 2006; Garib and Mahmud, 2004; Mammadov, 2010).

It is clear from the morphological description of the section that the color of these soils is light gray in the

upper layer, light gray and gray in the middle layers, and straw in the lower layer. The structure is not selected on the top layer, topavari and small topavari on the middle layer, and on the bottom layer. The granulometric composition is light clay throughout the profile. The density is hard on the top layer and less hard and soft on the bottom layers. Roots and rhizomes, root residue, vertical cracks, rust and carbonate stains are found along the profile from new derivatives and alloys. These soils are boiled under the influence of 10% hydrochloric acid (HCl). Humidity is dry in the upper layers and less moist in the lower layers. Transitions to genetic layers are clear and gradual throughout the profile (Mammadov, 2010; Rinn, 1996; Shiyatov, 2000).

According to the results of laboratory analysis, the granulometric composition of light gray-meadow soils is light clayey and heavy clayey. Thus, the amount of physical clay in these soils is 45.16-52.08% in the upper layers, and the profile length is 45.16-55.96% (Table 5).

The hygroscopic humidity of the main components varies between 4.3-5.3% throughout the profile. Total humus is 1.74-1.96% in the upper layers, and the profile length is 0.76-1.96%. According to the total humus, the amount of total nitrogen is 0.08-0.16%. The amount of carbonate is 10.26-14.11% throughout the profile (Mammadov, 2010; Mammadov *et al*., 2016; Schweingruber, 1996). The pH in the water suspension is 8.19-8.34 units, which indicates that these soils are alkaline (Table 6).

The total amount of absorbed bases in light gray-meadow soils is 26.30-33.05 mg. The percentage of Ca cations is 60.41-63.41%, the Mg cation is 34.01-36.57%, and the Na cation is 2.44-3.28% (Table 7).

Table 5. Granulometric composition of light gray-meadow soils (absolute dry soil, in%).

Section №	Depth in cm	Particle size in mm, quantity in%						In% of physical clay
		1-0.25	0.25-0.05	0.05-0.01	0.01-0.005	0.005-0.001	<0.001	<0.01
1	2	3	4	5	6	7	8	9
2)Light clay, thick, light gray-meadow								
55	0-22	0,81	25,52	21,60	19,56	17,24	15,28	52,08
	22-55	0,51	21,28	24,04	22,18	19,80	12,24	54,20
	55-88	0,84	25,60	22,32	20,12	17,52	13,60	51,24
	88-122	0,66	17,06	26,32	24,16	20,44	11,36	55,96
	122-155	0,70	23,10	22,52	20,56	17,76	15,36	53,68
76	0-22	0,70	23,26	24,60	22,32	16,48	12,64	51,44
	22-57	0,65	18,67	26,80	24,24	19,92	9,72	53,88
	57-92	0,82	25,58	23,52	21,40	17,36	11,32	50,08
	92-130	0,70	21,58	25,56	23,68	18,96	9,52	52,16
	130-157	0,84	27,68	22,28	20,32	16,16	12,72	49,20
3)Heavy clayey, thick, light gray-meadow								
3	0-23	1,63	33,73	19,48	17,56	15,32	12,28	45,16
	23-54	1,36	30,84	20,08	18,04	15,16	14,52	47,72
	54-89	1,12	27,72	21,56	19,20	16,08	14,32	49,60
	89-127	0,90	23,62	24,36	22,40	17,44	11,20	51,12
	127-153	0,88	21,48	25,40	23,72	19,76	8,76	52,24
21	0-25	1,36	30,84	20,08	18,04	15,16	14,52	47,72
	25-58	1,02	23,70	24,92	22,16	18,72	9,48	50,36
	58-93	0,78	21,24	25,80	23,76	20,16	8,26	52,18
	93-132	0,64	20,72	25,20	23,48	19,72	10,28	53,44
	132-158	0,91	24,49	23,48	21,88	17,60	11,56	51,12
47	0-24	1,52	29,18	22,30	20,46	17,10	9,44	47,00
	24-58	0,66	27,88	21,28	19,44	17,32	13,40	50,18
	58-91	0,88	22,84	24,24	22,76	18,92	10,36	52,04

	91-132	0,76	26,24	22,00	20,12	18,62	12,26	51,00
	132-161	0,82	22,18	23,60	21,52	18,28	13,64	53,40
61	0-23	1,20	29,92	20,52	18,24	15,64	14,48	48,36
	23-56	0,96	28,64	22,60	20,20	18,44	9,16	47,80
	56-90	0,88	26,60	23,28	21,40	19,92	7,92	49,24
	90-127	0,75	23,37	24,52	22,36	19,68	9,32	51,36
	127-154	0,93	26,07	22,72	20,96	17,08	12,24	50,28

Table 6. The main components of light gray-meadow soils(in absolute dry soil, in%).

Section №	Depth in cm	Hiqros-kopik moisture	General		CO_2	To CO_2 according to Ca CO_3	pH watter suspension at the age of
			Humus	Nitrogen			
1	2	3	4	5	6	7	8
2) Light clay, thick, light gray-meadow							
55	0-22	5,0	1,96	0,16	5,45	12,40	8,23
	22-55	5,2	1,47	0,13	5,83	13,25	8,29
	55-88	4,9	0,82	0,09	5,08	11,54	8,31
	88-122	5,3	---	---	5,64	12,83	8,33
	122-155	5,1	---	---	5,26	11,97	8,27
76	0-22	4,9	1,74	0,14	4,89	11,12	8,25
	22-57	5,1	1,31	0,12	5,45	12,40	8,29
	57-92	4,8	0,92	0,09	6,20	14,11	8,32
	92-130	5,0	---	---	5,08	11,54	8,30
	130-157	4,6	---	---	4,70	10,69	8,29
3) Heavy clayey, thick, light gray-meadow							
3	0-23	4,3	1,96	0,16	4,51	10,26	8,23
	23-54	4,5	1,47	0,13	5,26	11,97	8,28
	54-89	4,7	0,82	0,09	4,70	10,69	8,26
	89-127	4,9	---	---	5,08	11,54	8,30
	127-153	5,0	---	---	5,45	12,40	8,32
21	0-25	4,5	1,90	0,15	5,64	12,83	8,31
	25-58	4,8	1,36	0,12	5,26	11,97	8,34
	58-93	5,0	0,76	0,08	5,83	13,25	8,29
	93-132	5,1	---	---	5,45	12,40	8,30
	132-158	4,8	---	---	5,08	11,54	8,33
47	0-24	4,5	1,80	0,15	5,08	11,54	8,30
	24-58	4,7	1,36	0,12	6,20	14,11	8,34
	58-91	5,0	0,87	0,09	5,64	12,83	8,29
	91-132	4,9	---	---	5,26	11,97	8,27
	132-161	5,1	---	---	4,89	11,12	8,30
61	0-23	4,5	1,90	0,15	4,89	11,12	8,19
	23-56	4,6	1,52	0,13	5,26	11,97	8,24
	56-90	4,6	0,92	0,09	5,08	11,54	8,29
	90-127	4,9	---	---	5,64	12,83	8,31
	127-154	4,8	---	---	6,02	13,68	8,34

Table 7. Amount of absorbed bases in light gray-meadow soils (absolute dry soil, in%).

Section №	Depth in cm	Absorbed bases, in mg.ekv			Swallowed of the basics in total mg.ekv	From the sum of the won bases, %-with		
		Ca	Mg	Na		Ca	Mg	Na
1	2	3	4	5	6	7	8	9
2) Light clay, thick, light gray-meadow								
55	0-22	19,00	10,50	0,90	30,40	62,50	34,54	2,96
	22-55	20,50	11,50	1,05	33,05	62,03	34,79	3,18
76	0-22	18,00	10,50	0,75	29,25	61,54	35,90	2,56
	22-57	19,00	11,50	0,95	31,45	60,41	36,57	3,02
3)Heavy clayey, thick, light gray-meadow								
3	0-23	19,50	10,50	0,75	30,75	63,41	34,15	2,44
	23-54	18,50	10,00	0,90	29,40	62,43	34,01	3,06
21	0-25	17,50	9,50	0,85	27,85	62,84	34,11	3,05
	25-58	19,00	10,50	0,95	30,45	62,40	34,48	3,12
47	0-24	16,50	9,00	0,80	26,30	62,74	34,22	3,04
	24-58	18,00	10,00	0,95	28,95	62,18	34,54	3,28
61	0-23	19,00	10,50	0,80	30,30	62,70	34,66	2,64
	23-56	19,50	11,50	0,95	31,95	61,03	36,00	2,97

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