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IMPACT OF MICRORELIEF ON SALINIZATION PROCESS IN THE SOILS OF THE RESEARCH ZONE (ON THE EXAMPLE OF THE SHIRVAN STEPPE)

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Abstract. An impact of microrelief on salinization process in the soils of the Ujar Support Point was studied and a salinisation map of the same zone was compiled in the article. The researches show that the salts quantity in microhollows is more than in the areas. The soils are salinized to an average, strong and verystrong degree in the zone. But the unsalinized and weak salinized soils spread in the plane areas.

Key words: salts quantity, salinized soils, salinization map, salts type, humus, microrelief.

INTRODUCTION

An investigation of salts quantity, type, a placement of subsoil waters, their mineralization in the same soils in evaluation of the soils meliorative state is one of the main problems. For this purpose the salinization processes forming reasons in the same soils must be studied; the salts spreading legitimacy along the profile must be identified. In many cases incorrect using from soils causes soils salinization and solonetzification and this results in decrease of the fertility indices, reduction of productivity. For this purpose, definition of the salts quantity and type, investigation of their influence on plants productivity and comparative analysis in the same zones are actual. Corresponding to the subtropic arid semi-desert climate the soils concern the grey, meadow-grey, grey-meadow, floodplain-meadow, boggy-meadow and other tipes. A quantity of carbonates along the profile is 10-22 %; physical clay 65-85 %, but humus on upper layers is 1,59-2,86 %. These soils depended on the relief condition in the Kur-Araz lowland and exposed to the subsoil waters impact some or other degree [1-4].

OBJECTS AND METHODS

The researches were performed in the soils of the Ujar Support Point in the Shirvan plain qalani var. The characteristic places have been selected for the purpose of investigation of the salt quantity and

subsoil waters mineralization, their placement level, the soil and water samples have been taken. The chemical analyses which are required under the laboratorial condition were performed by generally accepted methods [5].

RESULTS AND DISCUSSION

During the research the salts quantity: in the same experimental area and subsoil waters level, change of their mineralization have been studied and compared with the consequences of 2012-2015. During an investigation of the salts coposition and type in the soils of the Kur-Araz lowland V.R.Volobuyev [2] showed that Cl and SO₄ ions exceed in salts composition in the same zones. As regards the soils type their change till chloride, chloride-sulphate and sulphate type has been shown.

G.Z. Azizov [6] preferred an investigation of soils water-physical, chemical and other characters in the different regions of the Kur-Araz lowland, including Shirvan plain and identified a direction of the desalted process, scientific bases of the washing and irrigation norms, fixing of the interdrainage distances.

M.G. Mustafayev [7] showed in his researches that correct use of the soil and satisfactoriness of the collector-drainage systems caused gradual improvement of the same soils meliorative state. But the salts quantity diminished, even secondary

salinization can be found in some areas because these processes didn't occur in the same direction in all cases.

The cuts were put in the characteristic places with the purpose of the investigation of the microrelief impact on salinization process and the soil samples were taken over the genetic layers. An importance of the relief is great in soils formation and soil cover development.

The relief participates as a main factor in distribution of the sun radiation and rainfalls depending on the slopes exposition and inclination and influences the water, heat, food, oxidation-reduction and salt regimes of the soil.

During the research a change of the salts quantity must be studied depending on microrelief in the soils from the experimental plots. Even if the research plot is used under the various agricultural plants, smoothing, (planning), deep sowing, loosening and other measures haven't been performed in the same areas for a long time. Because of heavy granulometric composition and weakness of the water-permeability, not performing the abovementioned measures caused formation of the salinization, solonchification processes. These processes show off in the hollow parts of microrelief of the same areas.

The researches show that the salts number in the hollow parts of microrelief of the soil is higher, their composition changes till chloride, sulphate and sulphate-chlorine type [8-10]. For the purpose of learning these problems, some indications of the soil cuts which were put at 0-200 cm depth in the Ujar Support Point were investigated and the consequences were given on the table 1.

As is seen from the tables the parameters change along the profile in all the cut, increase of the salts quantity is mainly observed towards low layers. The researches show that increase of the salts number along the profile was observed in

microhollows of soils in 2012-2015. Their quantity is 1,5-2,5 times more than other areas and the strong and very strong salinized soils spread in the same plots. Generally, Cl and SO₄ ions exceed in the salts composition of all the areas and their values are accordingly high where the salts number is more. Only in some places Ca and Mg ions exceed besides them (cut 9 and 20). The salts quantity in the same places is 1,69-2,79 % and the soils are mainly loamy and clayey. Generally, the soils of the experimental area are sulphate, sulphate-chlorine, chlorine-sulphate for the salts structure.

But the soils concern the chlorine type in only very strong salinized areas. Compiling of the soils salinization maps for is considered one of the main problems.

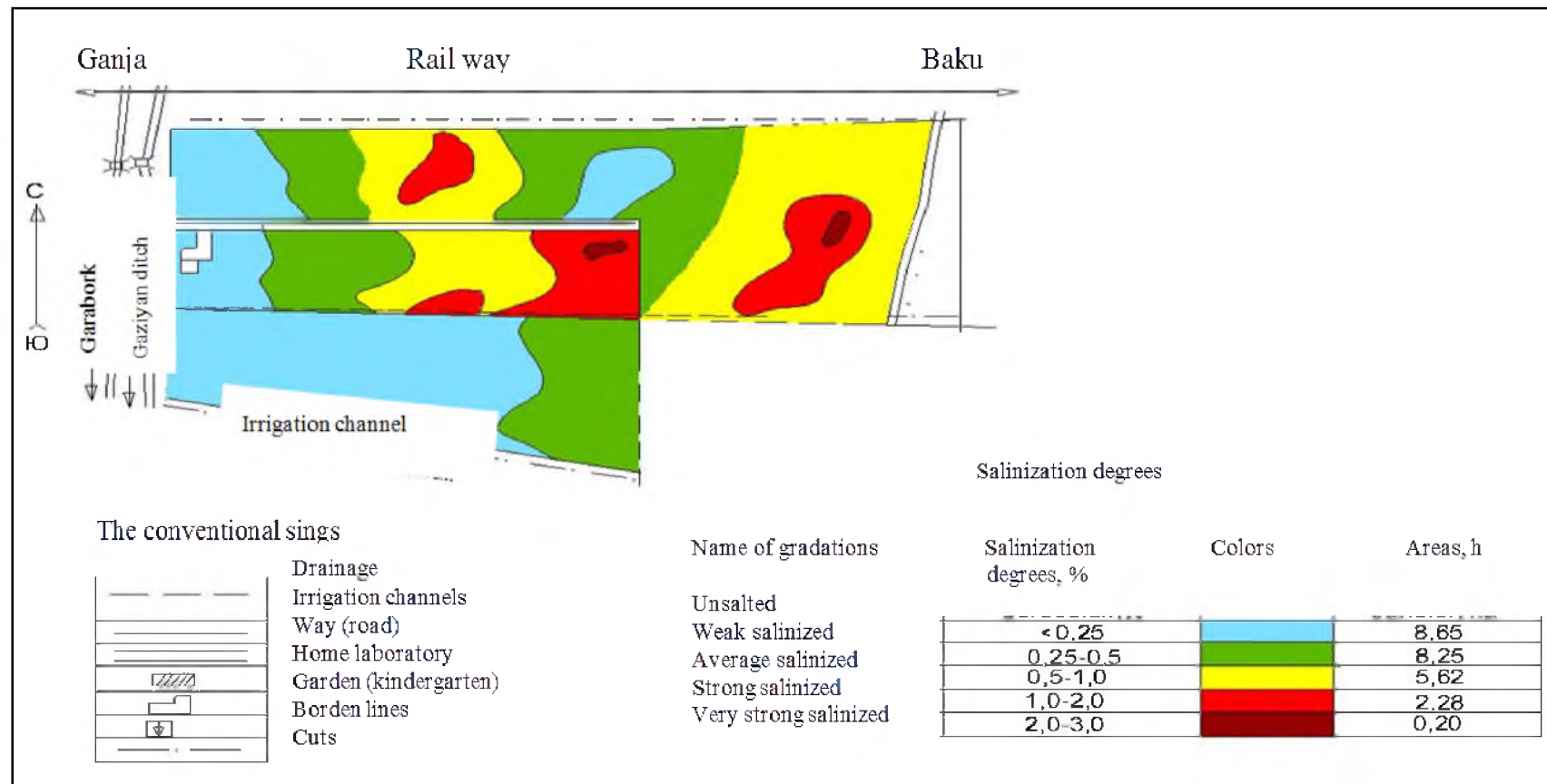
Generally, some researchers performed different soil researches performed different soil researches in the Shirvan dwzw and compiled maps for the separate experimental areas [3, 7]. During the investigation they paid a special attention to salinization and solonchification problem in the soils of the experimental areas.

As is known the salinization and solonchification problem of the 3 soils is a serious problem and the agromeliorative and agrotechnical measures are required in order to prevent from it. Occurring these processes caused aggravation of the soils fertility parameters and a strong decrease of the agricultural plants.

The following soils according to the salinization degrees spread in the Ujar Support Point; unsalted soils 8,65 hectares; salinized to a weak degree - 8,25 hectares; the soils salinized to an average degree - 5,62; the soils salinized to a strong degree - 2,28 h; the soils salinized to a very strong degree - 0,20 h. According to the researchers consequences a salinization map was compiled at a scale of 1:2000 (pic. 1). While the map was compiling, V.R.Volobuyev's classifications were used.

Table 1 – Change of the salts quantity in the soils of the Ujar Support Point

№-of kuts	Depth, by cm	mq-ekv							%							Total of salts, %	Dense residue, %-with
		CO ₃	HCO ₃	Cl	SO ₄	Ca	Mg	Na+K	CO ₃	HCO ₃	Cl	SO ₄	Ca	Mg	Na+K		
2012 year																	
U-9 (microhollow)	0-20	no	0,67	25,77	5,66	5,40	3,08	23,35	no	0,041	0,902	0,272	0,108	0,037	0,537	1,897	1,906
	20-40	---	0,64	30,94	3,71	5,45	3,42	26,04	---	0,039	1,083	0,178	0,109	0,041	0,599	2,049	2,160
	40-60	---	0,61	31,86	3,73	5,95	3,25	26,57	---	0,037	1,115	0,179	0,119	0,039	0,611	2,100	2,223
	60-100	---	0,61	31,91	3,75	6,00	3,17	26,65	---	0,037	1,117	0,180	0,120	0,038	0,613	2,105	2,235
	100-150	---	0,64	30,83	6,73	6,60	3,92	27,09	---	0,039	1,079	0,323	0,132	0,047	0,628	2,248	2,354
	150-200	---	0,67	28,91	11,93	9,40	4,67	27,09	---	0,041	1,012	0,573	0,188	0,056	0,623	2,493	2,523
	200-250	---	0,61	28,91	16,28	9,40	5,00	31,40	---	0,039	1,012	0,782	0,844	0,060	0,655	2,788	2,845
U-20 (microhollow)	0-20	no	0,52	28,09	3,77	5,75	3,50	22,83	no	0,032	0,983	0,181	0,115	0,042	0,525	1,878	1,995
	20-40	---	0,36	29,91	7,06	8,55	4,67	23,65	---	0,022	1,047	0,339	0,171	0,056	0,544	2,179	2,234
	40-60	---	0,38	31,89	9,12	12,35	5,33	23,26	---	0,023	1,116	0,438	0,247	0,064	0,535	2,423	2,567
	60-100	---	0,36	33,46	10,81	11,65	5,25	27,87	---	0,022	1,171	0,519	0,233	0,063	0,641	2,649	2,780
	100-150	---	0,39	31,86	7,41	9,20	3,42	26,65	---	0,024	1,115	0,356	0,184	0,041	0,613	2,333	2,453
	150-200	---	0,48	28,34	5,68	6,70	3,50	25,22	---	0,029	0,992	0,273	0,134	0,042	0,580	2,050	2,116
	200-250	---	0,52	27,29	6,68	5,65	3,17	25,35	---	0,032	0,955	0,321	0,113	0,038	0,583	2,042	2,109
2015 year																	
U-9 (microhollow)	0-20	no	0,33	0,020	25,14	0,880	3,44	0,165	no	5,00	0,100	2,42	0,029	21,49	0,494	1,688	1,693
	20-40	---	0,33	0,020	25,71	0,900	6,60	0,317	---	7,65	0,153	3,50	0,042	23,18	0,533	1,965	1,968
	40-60	---	0,34	0,021	28,00	0,980	8,77	0,421	---	11,10	0,222	4,17	0,050	21,84	0,502	2,196	2,200
	60-100	---	0,36	0,022	27,86	0,975	10,10	0,485	---	10,85	0,217	4,00	0,048	23,47	0,540	2,287	2,289
	100-150	---	0,33	0,020	27,63	0,967	7,08	0,340	---	6,05	0,121	2,25	0,027	26,74	0,615	2,090	2,094
	150-200	---	0,41	0,025	25,00	0,875	5,35	0,257	---	5,50	0,110	2,50	0,030	22,76	0,524	1,821	1,824
	200-250	---	0,41	0,025	23,83	0,834	6,25	0,300	---	4,50	0,090	2,08	0,025	23,91	0,550	1,824	1,829
U-20 (microhollow)	0-20	no	0,49	0,030	25,23	0,883	3,56	0,171	no	5,25	0,105	2,67	0,032	21,36	0,491	1,712	1,715
	20-40	---	0,33	0,020	28,57	1,000	6,85	0,329	---	8,05	0,161	3,83	0,046	23,87	0,549	2,105	2,107
	40-60	---	0,34	0,021	28,74	1,006	8,91	0,428	---	11,35	0,227	4,50	0,054	21,14	0,509	2,245	2,249
	60-100	---	0,34	0,021	28,60	1,001	10,60	0,509	---	11,15	0,223	4,42	0,053	23,97	0,551	2,358	2,362
	100-150	---	0,36	0,022	28,71	1,005	7,20	0,346	---	6,20	0,124	2,58	0,031	27,49	0,632	2,160	2,166
	150-200	---	0,44	0,027	25,49	0,892	5,48	0,263	---	5,70	0,114	2,67	0,032	23,04	0,530	1,858	1,861
	200-250	---	0,49	0,030	25,43	0,855	6,48	0,311	---	5,15	0,103	2,33	0,028	23,92	0,550	1,877	1,882
			0,41	0,025	24,34	0,852	6,20	0,298		4,75	0,095	2,08	0,025	24,12	0,555	1,850	1,856



Picture 1 - Salinization map of the soils in the Ujar Support Point (2016). M 1:2000, compiled under a leadership of the academician M.P.Babayev and Y.A.Majaisky; F.M.Mustafayev

CONCLUSION

As a result of the investigations the water-physical characters in the soils of the Ujar Support Point have been studied and it was determined that their indices changed as follows: a quantity of physical clay -51,10-70,10 %; humus-2,58-0,61 %; nitrogen 0,20-0,08 %; special weight-2,51-2,80 g/cm³; bulky weight-1,29-1,56 g/cm³; total humid capacity-28,40-36,62 %; porosity- 44,30-54,20 %; CaCO₃-11,55-15,58 %; pH 7,6-8,8; gypsum-0,244-0,944 %; a sum of the absorbed bases -11,10-30,95 mg.ekv.

Taking into account the microrelief in the research areas a salinization map

was compiled at a scale of 1:2000 in the experimental plot of the Shirvan plain. It was fixed in the soils of the Ujar Support Point: salinized soils-8,65h; weak salinized-8,25 h; average salinized-5, 62 h strong salinized 2,28 h and very strong salinized soils-0,2h.

The researches show that the salts change along the profile is various in soil, 0,134-2,785 % (1,69-2,79 % in mikro-hollows). The salt type is sulphate in the soils, but it is sulphate-chlorine, chlorine, chlorine-sulphate in some places, as sulphate and chlorine ions exceed in the salts composition of the experimental area.

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ТҮҮЙН

Мустафаев Ф.М., Мустафаев М.Г., Джебраилова Г.Г.

ТӘЖІРИБЕ ТЕЛІМІНІҢ ТОПЫРАҚТАРЫНЫҢ ТҮЗДАНУ ҮРДІСІНЕ ӘСЕРІ (ШИРВАН ДАЛАСЫ МЫСАЛЫНДА)

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Ширван даласының Үдjar тәжірибе телімінің топырақтарының тұздану үрдісіне микрорельефтің әсері зерттелді. Зерттеулер нәтижелері тегіс телімдерге қарағанда

шағын ойпаң жерлерде тұздардың мөлшерінің бірнеше есе жоғары екенін көрсетті. Шағын ойпаң жерлерде тұздану дәрежесі орташа, күшті және өте күшті болатыны анықталды. Тегіс телімдерде тұзданбаған және әлсіз дәрежеде тұзданған топырақтар таралған. Алынған деректер нәтижесінде осы аумақтың топырақтарының тұздануының картасы жасалынған.

Түйінді сөздер: тұздар мөлшері, тұзданған топырақтар, топырақ тұздануының картасы, тұздар типі, гумус, микрорельеф.

РЕЗЮМЕ

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ВЛИЯНИЕ МИКРОРЕЛЬЕФА НА ПРОЦЕСС ЗАСОЛЕНИЯ ПОЧВ ОПЫТНОГО УЧАСТКА (НА ПРИМЕРЕ ШИРВАНСКОЙ СТЕПИ)

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Изучено влияние микрорельефа на процесс засоления почв Уджарского опытного участка Ширванской степи. Исследования показали, что в микропонижениях содержание солей в несколько раз выше, чем на ровных участках. Установлено, что в микропонижениях почвы имеют среднюю, сильную и очень сильную степень засоления. На ровных же участках распространены незасоленные и в слабой степени засоленные почвы. На основе полученных данных составлена карта засоления данной территории.

Ключевые слова: количество солей, засоленные почвы, карта засоления, типы солей, гумус, микрорельеф.