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ПІШЕНДІК ЖОҢЫШҚАНЫҢ ӨНІМДІЛІГІ ЖӘНЕ ҚҰНАРЛЫЛЫҒЫНА ФУЛЯНЗЯ, Ж. (АҚУЫЗ, HARPIN ECC, 3 Г/Л) ӨСУІН РЕТТЕУШІНІҢ ӘСЕРІ

Аннотация

Пішендік жоңышқаны Фулянзя, ж. (ақуыз harpinEcc, 3 г/л) өсуін реттеушісімен бүрку жолымен өңдегенде алғашында олардың өсуі байқалды және екіншісі 20-21 күннен кейін қалыпты шығыны 1,0 л/га-на жақсы нәтиже берді: алғашқы орымда өсімдіктің биіктігі 120,0%, жасыл салмағы 121,7%, құрғақ салмағы (пішен) 118,0% өсті.

Кілт сөздер: өсуін реттеуші, жоңышқа, пішен, жасыл салмағы, құрғақ салмағы, құнарлылығы, өнімділігі.

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INFLUENCE OF THE GROWTH REGULATOR OF FULYANZYA, Zh. (PROTEIN, HARPIN ECC, 3 HA/L) ON EFFICIENCY AND PRODUCTIVITY OF HAYLAGLY ALFALFA

Summary

Processing of a senazhny lucerne regulator of growth Fulyanzya, ж. (protein of harpinEcc, 3 g/l) by spraying at the beginning of their growth and the second in 20-21 days with the consumption rate of 1,0 l/hectare yields good results: height of plants by the beginning of a hay crop has grown by 120,0%, green material for 121,7%, the dry weight (hay) for 118,0%.

Keywords: growth regulator, alfalfa, haylage, green material, dry weight, efficiency, yield.

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CHANGES IN THE SALT COMPOSITION OF THE SIEROZEM SOILS DURING WATERING WITH WASTEWATER IN THE CONDITIONS OF SOUTH KAZAKHSTAN

Abstract

The article presents the results of field research to determine the effect of irrigation with wastewater on the salt composition of the soil. The salt regime of soils was studied at all experimental sites in the south and southeast of Kazakhstan every spring and autumn. All laboratory analyzes were processed on EC-4 computer program of the institute "Kazgiprovodkhoz". They provide a basis to conclude that the gray-earth loamy soils of the region are classified as non-saline both before and after irrigation.

Keywords: soil, salt regime, wastewater, watering, chemical composition.

Introduction

Irrigation with wastewater affects the chemical properties of the soil. In irrigation waters can be useful and harmful salts, salinizing the soil. Excessive irrigation with wastewater causes the elution of silt particles from the arable loose layer to the subarable horizon. During frequent and abundant watering, the arable layer thickens, the aeration of the soil worsens, the most fertile surface layers of the soil are washed off, irrigation erosion is possible on fields with a slope. Excess of irrigation water is filtered by soil, penetrates into the ground and helps raise the ground water. Excessive watering with wastewater if there is no collector-drainage network in the fields, can lead to waterlogging of the soil, deterioration of its fertility, and on lands with a poor natural outflow of groundwater - to salinity. And on light soils and drained territories, excessive irrigation with wastewater does not cause soil salinity, on the contrary, the chlorine and sodium sulfates are washed out of the root layer and also the chemical leaching of sodium, calcium and magnesium from the primary soil materials and removal in groundwater.

Materials and methods

The salt regime of soils was studied in all experimental sites of the south and southeast of Kazakhstan every spring and autumn. All laboratory analyzes were processed on the EC-4 computer program of the institute "Kazgiprovodkhoz". Irrigation with wastewater leads to the accumulation of salts in the soil, which has a seasonal character. As a result, irrigation with wastewater to the autumn there is some increase in salts in the soil, and by the spring of next year their content is somewhat reduced. Significant influence on this phenomenon is due to autumn-winter precipitation and moisture-charging irrigation: the more their quantity, the more the soil stratification occurs.

Results and discussion

Carrying out only one water-charging irrigation in the farm "Akzhar" of the South Kazakhstan region resulted in a decrease in the salt content in a meter layer of soil from 0,095% in autumn to 0,082% in spring. The best conditions for stabilizing the accumulation of salts are created during the cultivation of alfalfa. Thus, in site No.3, in Zhambyl region, where sugar beet and barley alternated between 1978 and 1980 years, the salts increased from 0,087% in the initial to 0,097%, when alfalfa was cultivated here, the salt content decreased to 0,09%. The same is noted for other experimental sites, some of them in some years there was a capillary rise of salts to the soil surface. Cultivation of barley without irrigation led to an increase in salts in a meter layer of soil from 0,04% to 0,046%. This process also occurred in the early harvesting of rapeseed. To avoid capillary ascent of salts, it is necessary to cultivate life crops after crops with short vegetation.

Accumulation of salts in the soil depended on the irrigation regime. On the experimental site No.3, in the farm “Ilysk” after irrigation with a threshold of preliminary humidity 80% NH, the salt content in the meter layer increased from 0,039% in the initial to 0,04 – 0,049% under the crops of various low-prevalence crops, and during irrigation with a threshold of preliminary humidity of 70% NH, the salt content even decreased from 0,056% to 0,046. The accumulation of salts occurs mainly in the first years of irrigation, then during prolonged irrigation, while observing the system of crop rotation, their content is more stabilized. In the farm "Burundai" in Almaty region with 10 years of irrigation by wastewater of Almaty city, the content of salts in a meter layer of soil decreased somewhat: 0,082% to 0,078% (Table 1).

In Kyzylorda region, when watered by wastewater with salinity 1,1-1,3 g/l for 2 years of irrigation, there was a different accumulation of salts in the soil. If in autumn in the 0-100 cm layer the salt content was 0,72% of the dry soil weight, then at the end of the vegetation it was 1,02% of the dry soil weight.

Such accumulation of salts was earlier noted in the Zhambyl region. But the accumulation of salts later stabilized. This tendency of accumulation of salts is also noted in the studies of N.A. Kovaleva, V.T. Dodolina and others [1, 2, 3].

Table 1 - Change in the salt composition of the meter layer of soil in the experimental plot No.2 (Burundai, Almaty region), for corn for silage, in%

Time of determination	HCO_3	C1	SO_4	Ca	Mg	Na+K	Amount of salts
1	2	3	4	5	6	7	8
Spring initial state	0,036	0,005	0,018	0,12	0,001	0,010	0,082
Autumn variant 1,70% NH (control)	0,035	0,005	0,020	0,013	0,002	0,008	0,088
variant II 60% NH	0,040	0,014	0,024	0,014	0,002	0,012	0,101
variant III 70% NH	0,038	0,015	0,022	0,014	0,002	0,012	0,103
variant IV 80% NH	0,042	0,016	0,024	0,016	0,003	0,013	0,114
Annual	0,058	0,001	0,005	0,009	0,001	0,004	0,078

When watering with livestock flow, it was also found that the maximum intensity of salt migration is observed in the first years of irrigation with mixtures prepared by livestock runoff with clean water with an increased degree of mineralization, and in subsequent years, when the level of salinity of the root layer increases, and the intensity of salt removal by infiltration the rate of salt accumulation is declining. Experiments have shown that with increasing mineralization of irrigation water, the intensity of reduction of sulfate salts increases.

Established regularities of reducing the reserves of some salts in watering with mixtures of prepared flows with clean water are due not to the removal of these salts by infiltration waters beyond the root zone of the soil, the exchange reactions whose intensity increases with increasing mineralization of irrigation water.

At the same time, it has been established that with increasing mineralization of irrigation waters, the intensity of accumulation of chloride salts of sodium and magnesium increases, therefore, a change occurs in the qualitative composition of the salts in the aeration zone. The content of soda in the soils of the experimental plots, where it existed in the soil at the beginning of the experiment, did not increase. It should be noted that under the influence of the autumn-winter rainfall, there is also a change in both the quantitative and qualitative composition of the salts. During this period, some redistribution of salts occurs in the thickness of the aeration zone.

Calculations of the water-salt regime were carried out with known components of the water regime during the rotation of the beetroot in the farm "Tastobe" of the Zhambyl region and fodder crop rotations in the farm "Akzhar" of the South Kazakhstan regions by using the EC-4 computer program. (L.M. Rex, A.M. Yakirevich). The algorithm is based on the solution of the system of equations of salt transfer of S.F. Averyanov and I.P. Aidarov, describing the motion of moisture and salts in saturated soil zones. These calculations allowed us to trace the dynamics of the movement of salts and moisture in the full rotation cycle of the crop rotation.

In the farm "Akzhar" during non-washing irrigation regime, the maximum salinization of soils for the last year of crop rotation is 0,078%, in the farm "Tastobe" 0,099% (Table 2).

Table 2 - Amount of salts (t/ha) and the indicator characterizing the seasonal accumulation of salts (SAS) in the soil on options for studying the elements of irrigation techniques for alfalfa, barley and corn for silage

Sampling time	Indicators	Estimated layer, cm				
		0….10	0....30	0....60	0....100	0....150
1	2	3	4	5	6	7
Alfalfa						
Spring	amount salts	2,392	7,027	13.560	20, 849	29,539
Autumn	amount salts	2.064	6,755	13,340	20,618	28.842
	SAS	0,86	0,96	0,98	0,99	0,98
Alfalfa						
Spring	amount salts	1,779	5,597	11,829	18.40	26,185
Autumn	amount salts	2,962	7,718	14,485	22,103	29,112
	SAS	1,66	1,38	1,23	1,20	1.11
Barley						
Spring	amount salts	1,657	5,074	9,34	14,485	20,865
Autumn	amount salts	1,458	4,808	9,151	16,479	24,858
	SAS	0,88	0,95	0,98	1,14	1,19
Corn for silage						
Spring	amount salts	2,517	6,832	13,114	19,542	27,334
Autumn	amount salts	2.496	6,938	14,733	20,624	28,728
	SAS	0,99	1,02	1,12	1,06	1,05

Conclusions

Thus, the conducted experiments give grounds to conclude that the gray-earth loamy soils of the region both before and after irrigation with wastewater are classified as non-saline. Because, irrigation with prepared wastewater, does not impact negatively on the salt composition of the soil, which indicates that there is no salinity.

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ОҢТҮСТІК ҚАЗАҚСТАН ЖАҒДАЙЫНДА ТӨГІНДІ СУЛАРМЕН СУҒАРҒАНДАҒЫ СҰР ТОПЫРАҚТАРДЫҢ ТҰЗДЫҚ ҚҰРАМЫНЫҢ ӨЗГЕРУІ

Аңдатпа

Мақалада төгінді сулармен суғарудың топырақтың тұздық құрамына әсер етуін анықтау үшін жүргізілген далалық зерттеулердің нәтижелері келтірілген. Қазақстанның оңтүстік және оңтүстік-шығыс аймақтарында топырақтың тұздық құрамы жыл сайын көктемгі және күзгі мезгілдерде зерттеліп отырды. Барлық зертханалық анализдер «Қазгипроводхоз» институтының ЭЕМ ЕС-4 бағдарламасында өңделді. Бұл көрсеткіштер

сұр саздақ топырақтардың суғаруға дейін де және суғарылғаннан кейін де тұзданбаған топырақтар санатына жататындығын көрсетті.

Кілт сөздер: топырақ, тұздық режим, төгінді сулар, суғару, химиялық құрамы.

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ИЗМЕНЕНИЯ СОЛЕВОГО СОСТАВА СЕРОЗЕМНЫХ ПОЧВ ПРИ ПОЛИВЕ СТОЧНЫМИ ВОДАМИ В УСЛОВИЯХ ЮГО КАЗАХСТАНА

Аннотация

В статье приведены результаты полевых исследовании по выявлению влияния орошения сточными водами на солевой состав почвы. Солевой режим почвогрунтов изучался на всех опытных участках юга и юго-востока Казахстана ежегодно весной и осенью. Все лабораторные анализы обработаны на ЭВМ ЕС-4 программе института "Казгипроводхоз". Они дают основание сделать заключение что сероземные суглинистые почвы региона как до, так и после орошения относятся к категории незасоленных.

Ключевые слова: почва, солевой режим, сточные воды, полив, химический состав.

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STATE OF SOIL FERTILITY DURING WATERING WITH WASTEWATER IN THE SOUTH OF KAZAKHSTAN

Abstract

Article presents the results of our own laboratory, lysimetric and experimental studies using three types of wastewater for watering: depending on the type of soils: sierozem and meadow-bog soils. Also to assess the effectiveness of soil fertility, used the classification of I. Tyurin, M.M. Kononova, P. Machigin and Protasov, E. Arinushkina. In all experiments, as in watering with both pure water and wastewater, increase in humus was observed. This increase is more evident while watering with wastewater.

Keywords: watering, wastewater, soil, chemical composition, nutrients.

Introduction

Irrigation with wastewater creates favorable conditions for plant growth. However, non-compliance the irrigation regime, use of wastewater with a content of harmful contaminants above the maximum allowable concentration can lead to negative consequences. Irrigation with wastewater changes the physical state of the soil, the intensity of chemical and microbiological processes. Depending on the type of crop, the content of organic matter in the soil may decrease or increase. With the right choice of the method of irrigation, observance of the irrigation regime and the irrigation norm in combination with agrotechnical methods the negative impact of wastewater on the soil can be avoided.

During irrigation with wastewater, there is an accumulation of organic matter in the soil. Sewage contains organic soluble, suspended and colloidal substances that are retained in the soil. The increase in agricultural crop yields and especially the cultivation of perennial grasses are accompanied by an increase in the mass of their roots, which, when decomposed, partly turn into humus, which participates in the creation of a strong soil structure. In compliance with all conditions of irrigation with wastewater the accumulation of organic substances are ahead of the process of its destruction, and soil enriched with organic matter, soil fertility increases.