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The impact of sowing methods and pests on crop yields in rice growing in saline soils

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***Abstract*— The article presents the results of research on the growth, development of yields of widely introduced local varieties of rice "Guljahan" and "Iskandar" based on various types and degree of salinity (sodium chloride, sodium sulfate) soils.**

***Index Terms*— rice, soil salinity, pests, Iskandar and Guljahon rice varieties, Uzbekistan**

I. INTRODUCTION

In Uzbekistan, many organizational activities for improving agricultural system and developing reforms are being implemented during the last years. In particular, the decrees of the Cabinet Ministers of the Republic of Uzbekistan
No 15-16 on January 17, 2017, and No 156 on March 25, 2017 are aimed for rapidly developing rice growing.

Today the world experience of rice growing is being deeply learned, and even the state delegation of the Republic of Uzbekistan has been to Vietnam and closely studied the local rice growing, moreover, Uzbekistan is collaborating with the experts of China and Russia for evolving local rice growing. It is well known that salinity level of around 4 million hectares of arable lands is growing in our republic, and today the amount of saline lands is consist of about 60 percent of the land which is using for agricultural purposes and 15 percent out of these are extremely saline fields. There are over 300,000 hectares abandoned lands in the country which is impossible to grow main crops. The exact solution for cultivating other crops in these areas is growing rice crops and improving their reclamation status.

First of all, it need to be carefully learned the plant resistance for salinity in the soil and should be used the learned methods during the selection process. Secondly, it is necessary to learn international genetic resources that are suitable for conditions of global climate change, diseases and pests to weed exposure, and encourage the experience for the selection of local varieties. According to world scientists' calculation, due to the influence of harmful organisms, more than 30-40% of crops are dying in the world.

There are frequently damaging 33 types of rice crop pests in Uzbekistan, which are consist of 2 classes, 8 types and 15 families. Pests can great impact on rice crops during the whole vegetation period. Especially, during the rice growing the shielded shrimps (Apus concriformis sh.) gnaw the roots of young grasses and causes for young grasses death. Furthermore, it is defined that the heeled tripsi (Hanlotrips aculatus Farb.) damaged too at the end of drainage period.

According to long-term of scientific and practical results, the production of rice should be based mainly on increasing the harvest. This is achieved through the accumulation of many scientific and practical opportunities and using natural conditions, such as land, water, varieties, methods of plant protection, protection from pests and diseases. Therefore, it is necessary to learn the effect of rice cultivation in saline soils and impact of pests on fertility.

The object and subject of research: Not saline (C ion is less than 0.01%, SO iodine is less than 0.3%), weak saline (Cl ion 0.01 - 0.03%, SO ion 0.3% - 1.0%), moderately saline (Cl ion 0.03 - 0.1%, SO - 1.0 - 2.0%), strong saline (Cl ion 0.1 - 0.2%, SO 2 2.0% - 3.0%) Strong saline soils (more than 0,2 % C ion, more than 3% SO iodine), technology of cultivation of soil, seeds and seedlings, main pests of rice and "Guljahon", and "Iskandar" varieties.

The level of study for the issues: In recent years, wild varieties of the rice crops are being used during the processes of varieties production in the world. Because most of them have characteristics and features that are not in Oryza sativa and Oryza glaberrima. For example, Oriza nivarra has a virus-resistant feature that prevents the growth of the plant and can also develop normally in 3 % sulfate saline. Typical Oriza coarctata genus are resistant to 4-5% of soil salinity and can easily grow in 3% salinity. The usual rice varieties which the concentration is 0.75% do not grow in salinity.

It was researched on rice crop pests and peat control during years from 1930 to 1990 of last century by V.P. Shagaev (1937-1938)., V.S. Chuvakhin (1929), V. Vahithov (1957), M.P. Sborchikovas (1970) in our country. But this information does not respond to the current situation. At that time, rice was planted with mechanization, and the impact of pests on the spawning phase was rarely identified and the recommended chemicals for the protection of harmful pests were negatively affected for the environment and their spiritual deviation.

Nowadays, due to the use of new fertile, middle and late-ripening varieties, and sowing rice plant seeds after watering them are causing the increase "Apus concriformis Sh" and poultry tripsi "Hanlotrips aculatus Farb".

As shown above, the effect of the main pests on rice growing in saline soils, which is found in the technology of seedling and seeds, is not sufficiently scientifically substantiated.

The methods of the Research: Agrochemical analysis of soil samples were researched based on special methodology named "Methods of agrochemical analysis of soils and plants in Central Asia". The economical efficiency of rice crops was analyzed by V.N.Polozhy's method, the results of returns harvest analyzed by B.A. Dospexov's method which was named "Methodology of field experience" in 1982 and the analyses about pests were researched by (M.P.Sborchikova et al., 1971), and (Sh.T.Hojayev et al., in 2004)

The purpose of the research: To study rice growing in saline soils, impacts of methods of planting and pests on productivity.

The experimental system: The experiment was conducted in local "Guljahon" and "Iskandar" rice varieties.

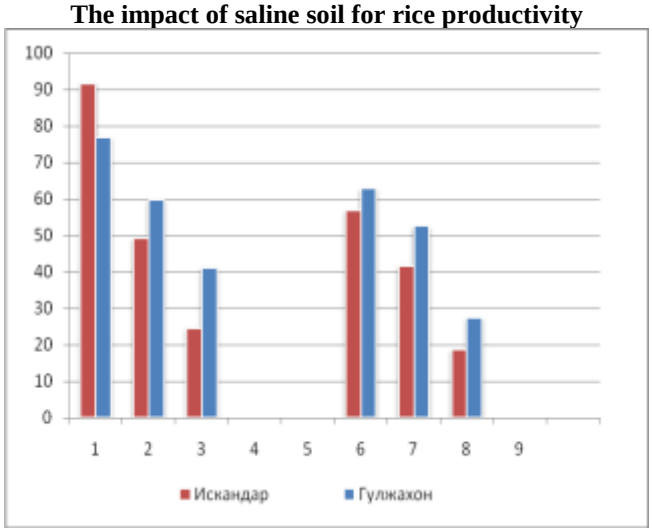
Variant-1 (Control variant) is non saline soils which Cl ion is less than 0.01%, soils with less than 0.3% SO ion.
Variant-2 is weak soil salinity with 0.01 - 0.03% Cl ion.
Variant-3 is the average soil salinity with 0.03 - 0.1% Cl ion
Variant-4 is strongly soil salinity with 0.1 - 0.2%, Cl ion
Variant-5 is highly strong soil salinity with more than 0.2% Cl ion.
Variant-6 is weak soil salinity with 0.3% - 1.0% SO ions
Variant-7 is average soil salinity with 1.0-2.0% SO ion.
Variant-8 is strong soil salinity 2.0% - 3.0% SO ion
Variant-9 is highly strong soil salinity with more than 3.0% SO ion.

II. Results

Usually several factors impacted for rice productivity, for example, water norm (sources are Kogay, 1975; Lev, 1984; Aleman, Popov, 1984; Hojambergenov, 1987; Khojambergenov, 1993) or rice farming (sources are Klushina, 1950; Nesterov, 1977, Kogay, 1980; Jaliev, 1980, Bidjay, 1985) was emphasized as a one of the most important factor for improving harvest. Also, the influence of rice seeding cycle for its grain harvest has been studied by many scientists (Iskhakov, 1969; Amandikov, 1976, Aitov, 1983, Ergashev, 2006, and others). According to the information of M.A. Ergashev it is clear that there is a difference growing the Guljamal varieties by breeding and seeding in gray soils.

To identify harvesting potential of rice varieties, each repetition of each variety and average of repetitions sum is considered as a harvest of that variety.

The impact of saline soil for rice productivity



The harvest of early ripening "Guljahon" rice variety was 76.8 centners per hectare in the first control variant.
The harvest of rice was 59.8 centners per hectare in the 2 nd version of the experimental soil under weak soil salinity with C1 ions of 0.01 - 0.03%. .
The harvest of 2 nd variant was lower to 17 centners/ha compared to control variant.
In the 3 rd variant with average soil salinity C1 ions 0.03-0.1%, there was 41.1 centners of harvest per ha and this meant that it was lower to 35.7 centners/ha compared to control variant
In the 6 th variant with weak soil salinity SO ions 0.3-0.1%, there was 62.9 centners of harvest per ha and this meant that it was lower to 14.8 centners/ha compared to control variant
In the 7 th variant with average soil salinity SO ions 1.0-2.0%, there was 52.5 centners of harvest per ha and this meant that it was lower to 24.3 centners/ha compared to control variant
In the 8 th variant with strong soil salinity SO ions 2.0-3.0%, there was 27.2 centners of harvest per ha and this meant that it was lower to 49.5 centners/ha compared to control variant
The harvest of early ripening "Iskandar" rice variety was 91.7 centners per hectare in the first control variant.
The harvest of 2 nd variant in the weak saline soil C1 0.01-0.03 was 49.2 centners/ha and this meant that it was lower to 42.4 centners/ha compared to control variant.
In the 3 rd variant with average salinity C1 ions 0.03-0.1%, there was 24.5 centners of harvest per ha and this meant that it was lower to 67.2 centners/ha compared to control variant
In the 6 th variant with weak salinity SO ions 0.3-0.1%, there was 56.9 centners of harvest per ha and this meant that it was lower to 34.7 centners/ha compared to control variant
In the 7 th variant with average soil salinity SO ions 1.0-2.0%, there was 41.6 centners of harvest per ha and this meant that it was lower to 50.1 centners/ha compared to control variant
In the 8 th variant with strong salinity SO ions 2.0-3.0%, there was 18.7 centners of harvest per ha and this meant that it was lower to 72.9 centners/ha compared to control variant
While soil salinity with the sodium sulphate increased by more than 3.0 percent, rice plants were observed to die.
The phenological monitoring of rice pests has been conducted in the field of scientific research. As a result of this, the criterion for the economic damage of rice pests has been formulated as follows:
1) In $1m^2$ there are 22 shielded shrimps,
2) In two plants there is 1 larvae of barley miner
3) In 1 plant there are 3 larvae of rice flies
4) In $1м^2$ there are 12 larvae of the coastal small fly
5) In $1м^2$ there are 6.5 rice beetles of water related creations

III. Conclusion

The period of starting date of planting seedlings to the early stage of root development has been observed as long (while soil salinity increases) in the other variants compared to the controlling option, and in the next stage it was vice verse during the process of ear development period to flowering. In other words, it was longer in control variants and it was faster in experimental variants
Due to inconvenient soil condition, flowering phase of plants occurs faster like ear development process. It remained during ripening period too.
It was becoming faster the process of ripening of rice sorts in experimental variants due to inconvenient soil conditions and in control variants it was slower in natural soil.
When the level of the soil salinity with sodium chloride salt reached to 0.2%, and with sodium sulphate reached 3.0%, it was observed that rice plants died.
Research result showed that growing period of early ripening “Guljahon” rice variety took less time due to soil condition and respectively, ripening period was faster.

Early-ripening "Guljahon" rice variety has been shown to be able to grow and develop in saline soils only 0.2% sodium chloride salt and 3.0% sodium sulfate salt.

Also, findings during growing process of rice in experimental station are follows: there were 22 shielded shrimps in $1m^2$, in two plants there was 1 larvae of barley miner, in 1 plant there were 3 larvae of rice flies, in $1м^2$ there were 12 larvae of the coastal small fly, in $1м^2$ there were 6.5 rice beetles of water related creations

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