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Research Article

THE EFFECT OF DIFFERENT IRRIGATION REGIMES ON THE YIELD OF MAIZE HYBRIDS

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ABSTRACT

In this article, information is given on the date, number and norm of irrigation of Uzbekistan-601 ECB, NS-6010 F1 hybrids of maize, which were carried out by furrow and drip irrigation in the conditions of weakly salted meadow alluvial soils of Bukhara province, and yield data obtained from options conducted in different irrigation regimes.

KEYWORDS

Maize, hybrid, irrigation, norm, number, dates, yield.

INTRODUCTION

In the world, the role of the maize plant is high in satisfying the demand of the population for food products, industry for raw materials, and livestock for nutritious food. Special attention is paid to the development of agrotechnologies of plant cultivation taking into account different soil and climatic conditions. Maize ranks the third place in the world after wheat and rice by cultivated area, and the first place in the group of fodder crops. Today, the area planted with maize plants is 22.5 million in the USA, 20.6 million in China, and 11.8 million in Brazil. hectares, and according to FAO data, in the structure of crops, the area of maize is 23% more than wheat in the USA, 63% in Australia, 70% in Germany, 43% in France, and 3.5% in Russia, the average yield consists of 7-10 tons per hectare [1, 2].

Maize ears (spikelet) contain more than 20 valuable microelements. Maize grain is rich in folic acid and magnesium, and regular consumption provides the human body with the required amount [3].

In the experiment of foliar feeding in the cultivation of maize plants, when treated with 1.0% preparation of H_2O_2, it was found that the green mass and yield of maize increased compared to the control options [4].

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Maintaining the quality of the crop using all available methods of pest population management is considered one of the urgent problems of the integrated control of maize pests [5].

Among cereal crops in the world, maize is widely grown, the total area is 162 million hectares, the harvest is about 850 million tons, the average yield is 5.2 tons/ha, the countries that grow the most are America, China [6].

MATERIALS AND METHODS

In the conducted research, agrochemical analysis, biometric measurements, phenological observations, irrigation were carried out according to the accepted methods of "Methods of field experiment" of the Scientific-Research Institute of Cotton Selection, Seed breeding and Cultivation Agrotechnologies.

Table 1

EXPERIMENTAL SYSTEM

Options	Name of maize hybrids	Irrigation methods	Irrigation regimes relative to LFFC, %
1	Uzbekistan-601 ECB	furrow irrigation (control)	70-75-70
2			70-80-75
3	NS-6010 F1		70-75-70
4			70-80-75
5	Uzbekistan-601 ECB	drip irrigation	70-75-70
6			70-80-75
7	NS-6010 F1		70-75-70
8			70-80-75

The data obtained from the research results were analyzed mathematically and statistically according to the method of Method of field experiments" by B.A.Dospekhov.

Field experiments were conducted in the field of "Zarif Ota" farm in "Bukhara" province, Bukhara region during 2020-2022. According to the experimental system, field experiments were carried out in 8 options and 3 repetitions (Table 1).

RESULTS AND DISCUSSION

The calculations of the annual and seasonal irrigation norms of irrigation in the experimental options for irrigation of maize hybrids for 2020-2022 are as follows, when soil moisture before irrigation was 70-75-70%, seasonal water consumption according to the 1st option of irrigation according to the plowed layer of the soil in 0-70 cm was equal to 3217 m3/ha, 1st irrigation 699.2 m3/ha, 2nd irrigation 599.3 m3/ha, 3rd irrigation 610.7 m3/ha, 4th irrigation 599.7 m3/ha, 5th irrigation 708.2 m3/ha were irrigated with irrigation water. In the 2nd variant of the experiment, the 1st irrigation was 705.0 m3/ha, the 2nd irrigation was 475.9 m3/ha, and the 3rd irrigation 500.2 m3/ha, 455.4 m3/ha

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in the 4th irrigation, 565.8 m3/ha in the 5th irrigation, 555.4 m3/ha in the 6th when irrigation was 70-80-75% compared to the limited field moisture capacity of the soil, and seasonal water 3,257 m3/ha of irrigation water was consumed if the irrigation norm was reached. In option 3, these indicators were 687.8 m3/ha, 566.9, 621.1; 588.8; 721.2 m3/ha of irrigation water was given, and the seasonal consumption of irrigation was equal to 3186 m3/ha, in the 4th variant of the experiment, 722.2 m3/ha was in the 1st irrigation, 477.3 m3/ha was in the 2nd irrigation, 488.7 m3/ha was in the 3rd irrigation, 466.8 m3/ha was in the 4th irrigation, and in the 5th irrigation 588.8 m3/ha and in the last irrigation 610.7 m3/ha, and the seasonal water consumption of irrigation was equal to 3354 m3/ha.

The results of the 2nd year of the experiment, irrigation works in the 1st variant of the experiment in 2021, when the soil moisture before irrigation is 70-75-70% relative to the limited field moisture capacity, and the plowed layer of the soil is 0-70cm, irrigations were 722.2 m3/ha in irrigation 1, 610.7 m3/ha in irrigation 2, 600.2 m3/ha in irrigation 3, 621.2 m3/ha in irrigation 4, 715.2 m3/ha in irrigation 5, it was irrigated 5 times during the season and seasonal water consumption was 3270 m3/ha, in the option 2, when 70-80-75% irrigation was carried out, irrigations were 732.6; 499.6; 511.7; 522.1; 511.7; and in the last 6th irrigation process, 621.2 m3/ha were irrigated with irrigation water, 3398 m3/ha during the season, and in the option 3, 722.2; 588.8; 633.5; 666.4 m3/ha and 744.0 m3/ha of irrigation water was used in the 5th irrigation and 3355 m3/ha of water was used during the season, in the 4th variant of the experiment, when the soil moisture before irrigation was 70-80-75%, irrigation was 744.0 m3/ha in the irrigation 1, 522.1 m3/ha in the irrigation 2, and 511.7 m3/ha in the irrigation 3, when the plowed layer of the soil was 0-70 cm, 488.8 m3/ha in the irrigation 4, 588.8 m3/ha in the irrigation 5, 667.0 m3/ha in the irrigation 6, the number of irrigations was 6 times, and seasonal irrigation was equal to 3522 m3/ha.

Picture 1. Photographs from the process of determining the yield of maize hybrids

The scientific results obtained in the last year of research in 2022 were as follows, according to the option 1, i.e. irrigation, the soil moisture before irrigation was 70-75-70% relative to LFMC, When carried out at 0-70 cm the arable layer of the soil during irrigation, the 1st irrigation consumed 744.0 m3/ha, the 2nd irrigation 622.1 m3/ha, the 3rd irrigation 610.7 m3/ha, the 4th irrigation the amount of consumed water was 639.5 m3/ha, and in the 5th period of irrigations, 727.9 m3/ha of irrigation water was used,

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the total seasonal amount of water was equal to 3338 m3/ha. In the second variant of the experiment, the total number of irrigations at 0-70 cm was 70-80-75% pre-irrigation soil moisture was carried out 6 times and the total seasonal water consumption was 3387 m3/ha, it was determined that water consumption of 1-5 was 744.0, 511.6, 499.2, 511.6, 488.7 and water consumption 6 was equal to 632.5 m3/ha. In the 3rd variant of the experiment, totally, 5 irrigations were carried out during the season, and the total amount of water consumed was 3263 m3/ha during the growing season. In the research carried out in field condition, the consumption of 1st irrigation water was 727.9 m3/ha, 2nd irrigation was 511.6 m3/ha, 3rd irrigation was 488, 7 m3/ha, 4th irrigation was 477.3 m3/ha, 5th irrigation was 599.2 and the last 6th irrigation was 622.1 m3/ha.

In the conducted 3-year researches, drip irrigation of maize was carried out in the 5-8 options listed in the experimental system, and the soil moisture before irrigation was 70-75-70% according to the limited field moisture capacity. according to the procedure, in the 2020 irrigations, a total of 10 irrigations were carried out in the 5th option, 293.7 m3/ha of water was used in the 1st irrigation, 298.3 m3/ha in the 2nd irrigation, 302.9 in the 3rd irrigation, 307.5 m3/ha in the 4th irrigation, irrigated with 257.0, 243.2, 234.0, 252.4, 243.2 and 234.0 m3/ha of irrigation water until the fifth irrigation and the tenth irrigation, during the whole season, drip irrigation with 2711 m3/ha of maize hybrid "Uzbekistan-601 ECB" was planted. In the 6th variant of the experiment, irrigations were carried out up to 12 times in the arable layer of 0-50 cm according to the 70-80-75% soil moisture obtained in relation to LFMC. The consumption of the 1st and 12th waters is as follows: 298.3; 289.1; 284.5; 215.7; 206.5; 211.1; 206.5; 201.9; 197.3; 201.9; 211.1 m3/ha and in the last 12th irrigation, it was determined that 247.8 m3/ha of water was consumed, and as for seasonal water consumption, it was 2772 m3/ha. The 7th variant of the experiment was irrigated in a water-saving way, and LFMC differed in irrigation according to the arable layer of the soil and it was irrigated according to 70-75-70%, in which the rate and number of irrigations also changed and In the 10-time irrigation agro-measure, a total of 2717 m3/ha of water consumption was measured, in the 1st water measurement it was equal to 298.3 m3/ha, according to the following irrigations, it was 293.7; 289.1; 302.9; 243.2; 247.8; 243.2; 238.7 m3/ha; 257.0 and 302.9 m3/ha of water were used in the 10th irrigation.

The analysis of the last 8th variant of the experiment is as follows, the same as in the 6th variant, the consumption of the given water changes every time, and 2723 m3/ha of water was consumed in the season, while the 1st and 12th irrigations were 302.9; 284.5; 293.7; 211.1; 197.3; 192.8; 203.4; 197.3; 206.5; 192.8; according to the results of the experiment carried out in 2021, in which 201.9 m3/ha of irrigation water was carried out, the maize hybrid "Uzbekistan-601 ECB" was planted in the 5-6 variants of the experiment, 7 and In the 8th options, the hybrid "NS-6010 F1" was planted and cultivated for, and the analysis of irrigations according to 70-75-70% showed 298.3 m3/ha in the 1st irrigation, 293.7 m3 in the 2nd irrigation /ha, 298.3 m3/ha according to the 3rd water; 4th irrigation 215.7 m3/ha, 5th irrigation 252.4 m3/ha, 6th irrigation 247.8 m3/ha, 7th irrigation 243.2 m3/ha, 8th irrigation drip irrigation was carried out with water consumption of 261.6 m3/ha, 215.7 m3/ha in the 9th water and 307.5 m3/ha in the last water. The 6th variant of the experiment, the hybrid of maize "Uzbekistan-601 ECB" was grown 11 times with irrigation water at a soil moisture level of 70-80-75% before irrigation, and during the growing season of the plant hybrid, the total irrigation water consumption was determined to be 2575 m3/ha. 307.5 m3/ha in 1st irrigation, 302.9 m3/ha in

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2nd irrigation, 293.7 m3/ha in 3rd irrigation, 215.7 m3/ha in 4th irrigation , the amount of water consumed in the 5th irrigation was 211.1 m3/ha, in the 6th irrigation 208.0 m3/ha, in the 7th irrigation 201.9 m3/ha, in the 8th irrigation a little less 197.3 m3/ha, 206.5 m3/ha in the 9th irrigation, 215.7 m3/ha in the 10th irrigation and 211.1-247.8 m3/ha in the 11th-12th irrigations with irrigation water watered. As for the 7th variant of the experiment, NS-6010 F1 hybrid of maize was planted, irrigated with 293.7 m3/ha of water in the initial water and 307.5 in the 2nd and 9th waters; 293.7; 307.5; 247.8; 252.4; 247.8; 238.6; 261.6 m3/ha and 298.3 m3/ha of irrigation were used in the 10th irrigation. According to the 8th variant of the experiment, the total amount of water was 12 times, the consumption of fresh water was 2500 m3/ha. 298.3 m3/ha in the 1st irrigation, 293.7 in the 2-4 irrigations; irrigation was carried out with water of 298.3 and 206.5 m3/ha, 201.9 in 5-10 irrigations; water consumption of 206.5; 197.3; 201.9; 197.3; 192.7 m3/ha was determined, 206.5 m3/ha was irrigated in 11 irrigations. In 2022, in option 5, where the hybrid of maize "Uzbekistan-601 ECB" was planted, 10 irrigations were carried out, in 1-4 water sections where one time norms of irrigation consumption 302.9; 298.3; 307.4; 302.9 m3/ha was determined. During subsequent irrigations; 257.0; 252.4; 247.8; 261.6; 257.0 m3/ha and the norm of water consumption in the last 10th irrigation was 307.4 m3/ha and the annual water consumption according to the option was 2795 m3/ha.

In the 6th variant of the experiment, the number of irrigations was increased by 2 times, due to which the soil moisture before irrigation was maintained at 70-80-75% soil moisture +-2% soil moisture, and the number of irrigations carried out 11 times and the amount of water used in 1-5 irrigations was 312.0; 307.5; 293.7; 215.7 m3/ha; and the 5th irrigation was irrigated with 201.9 m3/ha of water, in the following irrigations, 6-10 irrigations, it was observed that 192.7; 206.5; 201.9; 211.1 m3/ha of water was consumed. In options 7-8 of the experiment, the NS-6010 F1 hybrid of maize was planted, and in option 7, the number of irrigations was carried out 10 times, and it was determined that the total amount of water used between the growing seasons was equal to 2731 m3/ha. In the 8th variant of the experiment, the number of irrigations was carried out 11 times in total, and the total rate of consumption was determined to be 2482 m3/ha. When the yield of maize hybrids was analyzed by years, in the fully irrigated option, in 2020, 62.8 c/ha were harvested, in 2021, 63.1 c/ha, and in the third year, 62.4 c/ha, in average 62.8 c/ha was harvested in three years. Option 2 of the experiment, soil moisture before irrigation was 70-80-75%, when the arable layer of the soil was 0-70 cm, the irrigation method is equal to 65.5 c/ha in the 1st year, and 65.8 c/ha in the 2nd year, in the 3rd year, this indicator was equal to 64.9 c/ha, the average was 65.4 c/ha. In the ¾ variants of the experiment, NS-6010 F1 hybrid of maize was planted, irrigation was carried out according to the order of 70-75-70% and 70-80-75% in a layer of 0-70 cm, In the 1st year, 79.1-89.1 c/ha grain yield was cultivated. In the 2nd year, the yield was 80.3 - 90.4 c/ha, and in the 3rd year, these indicators were equal to 80.6 and 90.3 c/ha. When irrigation was carried out at the expense of drip irrigation of the experiment, the 5th option irrigation regime was 70-75-70%, when the arable layer was 0-50 cm by phases, in the 1st year of the experiment, it was equal to 67.0 c/ha, in the 2nd and 3rd years yields was equal to 68.2 and 67.4 c/ha were obtained, which in turn was equal to on average 67.5 c/ha. In the 6th option of the experiment; it was found that it was equal to 71.9; 70.3 and 73.6 c/ha by years, and when the average was calculated, it was equal to 71.9 c/ha. In the 7 variants of the experiment, the yield indicators for the years were 92.8 and 94.7 and 95.2 c/ha, and the average was equal to 94.2 c/ha. The yield data obtained during the 3rd year of the 8th option yielded 108.3, 107.8 and 110.1

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c/ha, and when the average was determined, 108.7 c/ha of maize grain was obtained.

CONCLUSION

In total of 8 options, experiments were conducted on various irrigation methods of maize hybrids in the conditions of weakly salted meadow alluvial soils of Bukhara province, i.e. drip and drip irrigation, Uzbekistan-601 ECB hybrid compared to NS-6010 F1 hybrid obtained a higher grain yield when drip irrigation was carried out at 70-80-75% pre-irrigation soil moisture.

REFERANCES

1. Atabaeva X.N, Khudoykulov J.B – Plant science - T., 2018, P.255-256. (In Uzbek language)
2. Khudoykulov J.B, Azizov J.V and others // Maize cultivation // Agrobank 100 book collection, 24-book-Tashkent-2021, "Tasvir" publishing house-Colorpack LLC- P.40. (In Uzbek language)
3. Azizov K.K, Japparov A.A, Akhmedov A.J // Recommendation for growing sweet maize and beans as a cover crops in households - Agrochemical protection and plant quarantine - Scientific and Practical Journal - 2024, No. 2. P.146-147. (In Uzbek language)
4. Rashidova D.K, Mamedov N.M, Yakubov M.M // The effect of foliar feeding on the growth and development of a maize hybrid // Agrochemical protection and plant quarantine-Scientific and Practical Journal - 2024, No. 2. P.149-151. (In Uzbek language)
5. Akromov B.A // Maize and maize pests and their control // Agrochemical protection and plant quarantine-Scientific and Practical Journal - 2024, No. 2. P.41-46. (In Uzbek language)
6. Mashrabov M.I, Kazakboev S.S // Possibility of obtaining a high yield from maize in the conditions of typical sierozem soils - Agrochemical protection and plant quarantine - Scientific and Practical Journal - 2024, No. 2. P.147-149. (In Uzbek language).