UDK: 633.51:631.432.3

EFFECTS OF PLANT SCHEME AND TIMING ON RICE PLANT DRY MASS ACCUMULATION

Burxanova Nigora Hamid qizi,
Lutfillo Mirzayev Aribjanovich,
Doctor of Agricultural Science, DSc, Rice Research Institute, Uzbekistan
e-mail: l.mirzayev75@gmail.com

Abdulxay Normatov Umarovich,
Regional branch of Andijan region,
Institute of Soil Science and Agrochemical Research, Uzbekistan
e-mail: normatovabdulxay@gmail.com

Xurmatoy Jurayeva Rafiqjonovna,
PhD, Andijan Institute of Agriculture and Agrotechnologies, Uzbekistan
e-mail: Khurmatoyjuraeva84@gmail.com

Gulmira Ergasheva Tulqinbekovna,
Rice Research Institute, Uzbekistan

Annotation. This article discusses the optimal number of seedlings, planting schemes, and timing for rice cultivation with regard to dry mass accumulation. In order to obtain a high rice yield in our republic, meet the population's demand for rice, and save foreign currency by reducing imports, it is essential to use varieties that are resilient to local soil and climatic conditions and possess high-quality grain characteristics. Developing and implementing highly efficient, resource-saving agro-technologies for rice cultivation remains a key task.

Key words: rice, planting method, planting scheme, planting period, development phases, variety, dry mass, productivity.

Аннотация. Мақолада шолини кўчат усулида етиштиришда мақбул кўчат сони, экиш схемаси ва муддатларини ўсимликнинг қуруқ масса тўплашига таъсири ҳақида маълумотлар келтирилган. Республикамизда шолидан юқори ҳосил олиш, аҳолининг гуруч маҳсулотига бўлган талабини қондириш ва импорт қилинаётган миқдорини камайтириб валюта тежаш мақсадида тупроқ-иқлим шароитларига чидамли, сифатли дон кўрсаткичларига эга бўлган, юқори ҳосил берадиган навларни жойлаштириш, уларни етиштиришда юқори самарали ресурстежамкор агротехнологияларни ишлаб чиқиш ва жорий этиш, ўта муҳим вазифалардан бири ҳисобланади.

Калит сўзлар: шоли ўсимлиги, эртапишар, ўртапишар навлар, кўчат усули, экиш схемаси, экиш муддати, ривожланиш фазалар, нав, қуруқ масса, ҳосилдорлик.

Аннотация. В статье приведены сведения об оптимальном количестве сеянцев, схеме посадки и продолжительности возделывания риса по накоплению сухой массы растения. Для получения высокого урожая риса в нашей республике, удовлетворения спроса населения на рисовую продукцию и экономии валюты за счет сокращения объемов импортного риса размещение сортов, устойчивых к почвенно-климатическим условиям, имеющих высокие качественные показатели зерна, а также разработка и внедрение высокоэффективных и ресурсосберегающих агротехнологий при их возделывании является одной из важнейших задач.

Ключевые слова: рис, способ посадки, схема посадки, срок посадки, фазы развития, сорт, сухая масса, урожайность.

Introduction. Agriculture in our country is diverse, and rice has long been a staple food. Rich in proteins and vitamins, rice is a beloved dish that adds charm to our tables during holidays and celebrations. Currently, 80-90% of rice cultivation globally employs the seedling method. Taking into account the soil-climatic conditions and the biological characteristics of various rice varieties, enhancing the agrotechnology of both local and foreign rice varieties to boost productivity, adopting advanced global technologies, and making optimal use of

each hectare of land are critical areas of focus in rice farming.

In the President's decision "On Measures for the Further Development of Rice Cultivation", in 2021, at least 20% of the total rice fields should be planted with seedlings, 50% should be equipped with a land leveling system using laser equipment, 30% should be planted with modern seed drills, and in 2022, these indicators should be further increase is planned. Today, 100-110 thousand hectares of rice are planted in our country, the average yield is 35-38 centners per hectare, and the total yield is 395 thousand tons. This amount can only minimally satisfy the demand for rice, which is one of the main food products of our country's growing population. According to official data, about 55,000 tons of rice products are imported annually to fully meet the needs of the population. [1]

Research objective. The purpose of this study is to determine the effect of planting dates on the growth, development, productivity, and quality of rice plants under the soil and climatic conditions of the Andijan region.

The object of the study. In the conditions of Andijan region, the meadow marshy and saline soils of the agricultural field specialized for rice, the early-ripening "Arpa rice", the promising «Billur», the mid-ripening "Iskandar" and «Sadaf» varieties of rice.

Research subject. Optimum soil environment and seeding rate for growing rice seedlings in the Andijan region by transplanting rice varieties twice a year, optimal soil environment for growing rice seedlings, useful temperature summation for different periods, absorption of nutrients in the soil by rice varieties, development phases of rice varieties, leaf level, dry mass, determination of photosynthetic productivity, biometric indicators, grain quality and productivity.

Methods of research. «Methods of conducting field experiments», determining the amount of nutrients in the soil, «Metodika agrokhimicheskih, agrofizicheskih i mikroobilochicheskih issledovaniy v polivnyx rayonakh», leaf level calculation Vishnu M. Bhan and H.K. Pande (IRRI) calculation of useful temperature summation Qunying Luo, Michael Bange and Loretta Clancy method, crop cultivation costs, net profit and other economic indicators with the average price of 2017-2019 rice production and sales V.N.Polozhii in the method, the statistical analysis of the results obtained from the experiments was analyzed using the Microsoft Excel program based on the method of B.A. Dospekhov. [3]

Research results. Studies were conducted in the «Nodirbek Sholikor» farm, Moygir village, Izboskan district, Andijan region, focusing on rice cultivation across two annual harvest cycles. Before the start of the experiment, soil samples were collected and agrochemical analyses were carried out. Along the Karadarya coast in the Andijan region, the soil is meadow soil in irrigated areas and meadow swamp or swamp soil in other regions. Part of the soil is typical gray soil, with a long history of irrigation usage.

2- table

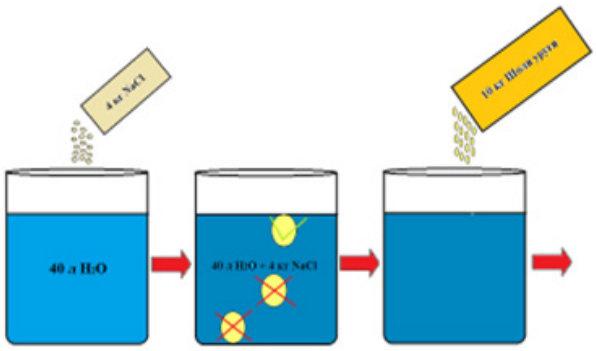
Agrochemical composition of the 0-30cm plow layer of the soil, (mg/kg) Data from Regional branch of Andijan region Institute of Soil Science and Agrochemical Research, Uzbekistan

№	Farmers name	Biohummus %	$N\text{-}NH_3$	P_2O_5	K_2O	pH
1	« Nodirbek Sholikor »	1,010	9,5	9,9	79	7,2

ISSN 2181-0826 4/2024 y.

The research work started in March, during the first ten days of this month, super-elite seeds of medium-ripe «Iskandar» variety of rice were sown in special cassettes in heated greenhouses. In this case, 180 grams of seeds were used in each cassette at the expense of 250 cassettes per one hectare. Preparation of rice seedlings and planting them in the field was carried out in the following stages. Sorting the first seeds in salt water. rice seeds were added to the saline solution and mixed slowly. A part of the rice seeds remained on the surface of the solution, and the rest sank to the bottom of the solution. The seeds that leaked onto the surface of the solution were removed and thrown away. The seeds that sank to the bottom of the solution were taken in a separate container and rinsed twice in clean water.

Picture-1





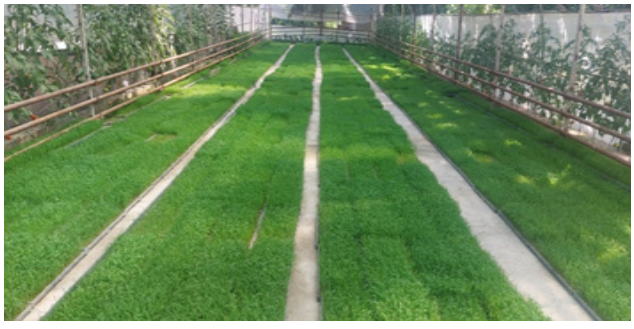
Treatment of second seeds. A solution was prepared by adding 10 g of Celest-Top (fungicide, insecticide, stimulant) to 10 l of water, and the seeds were soaked for 24 hours. Germination of third seeds. the treated seeds were rinsed twice in clean water and frozen in clean water for 2 days. During the cooling process, the water was changed every day. After 2 days, the seeds were removed from the water, rinsed thoroughly in warm water and wrapped in gray bags for 48 hours. From time to time warm water was sprinkled over the bags. During these 48 hours of wrapping in a bag, 1-1.5 mm long niches appeared in the seeds.

Picture-2









Preparation of the fourth soil mixture and placing it in cassettes. soil and manure were passed through a sieve with a diameter of 2-3 mm. The soil was mixed with 10% manure and 10% ammophos, 2 kg was placed in each cassette and spread evenly. Fifth - planting seeds. 170 g of germinated seeds were sown in each cassette containing the soil mixture, and the soil mixture mixed with sand in the amount of 2-3 mm was sprinkled over the sown seeds and watered with rain. Sixth care. the seeds were covered with a polyethylene film to ensure rapid germination. Film was taken after 2-3 days. Seedlings were cared for in the nursery for 30 days until they had 3-4 leaves. The degree of germination of rice seeds in a greenhouse environment was studied.

Table-1

Influence of the soil environment in the cultivation of rice seedlings

№	Ratios of soil and biohumus	Rice variety	Rice seed germination %
1	Soil (100%)	Iskandar	65
2	biohumus (100%)		82
3	Soil -B biohumus (1;1)		94
4	Soil - biohumus (0,75;0,25)		88
5	Soil - biohumus (0,25;0,75)		92
6	Soil - biohumus (0,60;0,40)		98

In this experiment, the proportions of soil and biohumus in the section of options are 1 option Soil (100), 2 option Biohumus (100%), 3 option Soil-Bihumus (1:1), 4 option Soil-Biohumus (0.75;0.25), 5 options Soil-Biohumus (0.50;0.50), 6 options Soil-Biohumus (0.25;0.75), 7 options Soil-Biohumus (0.60;0.40) were studied. During the study, the degree of germination of rice seeds in each variant and the air temperature of the greenhouse were also controlled. In the first decade of March, when studying the effect of the soil environment on the cultivation of rice seedlings in the greenhouse environment, the best option 7, i.e. soil-biohumus (0.60; 0.40) option, the germination rate of rice seeds was 98%. was found to be. It was determined that rice seed germination rate was 65% in the environment with soil (100%) of experiment 1. It has also been proven that vigorous rice seedlings grown in a good soil environment are not wasted by the seedling machine. [4].

The stronger the plant, the more branches there are, the better the above-ground and above-ground dry mass accumulation, and the higher the yield (2005) DC.Ghosh, BP.Singh [5].

K.K.Orazmetov, Yu.B.Saimnazarov, Ch.Kashqaboyeva stated (2012) that as the rate of nitrogen fertilizer increased from the specified mineral fertilizers in conditions depending on seedling thickness, plant height increased significantly in all development periods. Fertilizer rates were observed to have a proportional effect on aboveground dry mass accumulation per plant during the growing season. That is, in the control option, the dry mass accumulation of one plant during the period of complete flowering was on average 2.0-2.1 g, while in the option with nitrogen fertilizer 150 kg/ha, this amount was 2.8-4.0 g. In variants with a small number of seedlings per unit area, it was determined that the amount of above-ground dry mass accumulation was increased due to the stems formed from the buds on the plant [6].

F.K. Vrkos, based on his scientific research conducted in 1977, states that

ISSN 2181-0826 4/2024 y.

the accumulation of above-ground dry mass of the rice plant grows in parallel with the development of the leaf surface, and the above-ground and below-ground dry mass increases until the wax ripening period of the plant. 10-15 days before the full ripening of the crop, the accumulation of dry mass of the plant decreased [7].

V.I.Kostin, V.A.Isayev stated that a plant can fully show its potential based on its biology only when it receives the necessary and sufficient useful air temperature and sufficient nutrients (2004). and O.V. Kostinlar [8].

A.Abdullayev, 2007, during the cultivation of rice by the seedling method in Fergana Valley, in order to study the effect of mineral fertilizers on the growth and development of the above-ground and below-ground parts of rice, and on increasing the dry mass of the plant, during the growing period of the plant, five rice seedlings from each option were taken by the root, and its height and monitored the increase of dry weight. As a result of his scientific research, he stated that the increase in the amount of nitrogen fertilizer had a direct effect on the growth of the mass of above-ground and below-ground parts of the rice plant in both "Avangard" and "Barley rice" varieties under study. [9].

It is known that the main stem plays an important role in the formatio n of the above-ground part of the plant. Therefore, stem height, root length and dry mass accumulation were measured during the development periods of rice plants, namely tillering, tillering, tillering, wax ripening and full ripening. When the rice plant is planted as a seedling as a repeated crop, the planting dates and planting schemes, the number of seedlings, are of great importance for its stem height and dry mass collection. Because the better the plant is provided with light, heat, moisture, and water, the higher the development of its vegetative organs will be. As the vegetation period of the plant shortens, it tries to rapidly form more generative organs in order to leave its offspring. [10].

Planting periods are very important in the collection and accumulation of dry mass of the plant. Because, if plants are provided with light, heat, moisture, nutrients and water at a high level, the development of vegetative organs will be higher. As the vegetation period of the plant shortens, it is argued that it tries to rapidly form more generative organs in order to leave its offspring (2014) MH.Dar, S.Singh, US.Singh, NW.Zaidi, AM.Ismail [6].

Table-2

The effect of planting pattern and timing on the accumulation of dry mass of the stem and root of the rice plant, sm

№	Rice variety	The duration of planting in the cassette	The period of planting in the field	Phases of development							
				Tillering		booting		Panicle insertion		Ripening	
				stem	oot	stem	root	stem	root	stem	root
1	Iskandar	5 march	20 march	21,6	6,1	56,5	17,6	84,5	28,6	117,1	40,5
2	Sadaf			22,7	7,0	57,6	18,8	85,3	29,1	120,0	40,1
3	Arpa rice			22,1	6,8	57,3	18,6	85,0	29	118,5	40,8
4	Billur			20,8	6,7	58,6	21,2	85,3	31,3	119,4	41,2
5	Iskandar	5 march	25 march	24,6	7,1	60,1	22,1	89,1	32,1	121,1	42,2
6	Sadaf			24,2	6,1	59,1	21,7	86,7	32,0	120,6	41,6
7	Arpa rice			21,8	6,7	58,6	21,2	85,3	31,3	120,8	41,5
8	Billur			24,6	7,1	60,1	22,1	89,1	32,1	123,3	42,7

№	Rice variety	The duration of planting in the cassette	The period of planting in the field	Phases of development							
				Tillering		booting		Panicle insertion		Ripening	
				stem	oot	stem	root	stem	root	stem	root
9	Iskandar	5 march	30 march	24,2	6,1	59,1	21,7	86,7	32,0	121,2	42,1
10	Sadaf			23,4	6,4	58,2	21,1	86,2	30,7	120,2	41,2
11	Arpa rice			24,8	7,1	58,8	22,1	87,3	31,8	121,1	41,1
12	Billur			24,3	6,8	58,1	21,6	86,7	31,3	120,7	41,6

It was found out from the research that in the first decade of March (5.03), the first variant planted as a seedling in the 30x10x4 scheme in the "Iskandar" variety had a stem height of 21.6 cm and a root length of 6.1 cm in the budding phase. The second variant, "Sadaf" variety planted in the same period, had a stem height of 22.7 cm and a root length of 7.0 cm. The dry mass of the stem was 1.5 g/plant and the dry mass of the root part was 1.4 g/plant. In the first decade of March (5.03) in the 30x10x4 scheme, the third option "Barley rice" variety, the length of the stem was 22.1 cm and the length of the root was 6.8 cm. The fourth variant planted in the same period, that is, "Billur" variety, has a stem height of 20.8 cm and a root length of 6.7 cm. The dry mass of the stem was 1.3 g/plant and the dry mass of the root part was 1.2 g/plant.

In the first decade of March (5.03) in the 30x10x4 scheme, the fifth variant of the 20-day-old variety "Iskandar" had a stem height of 24.6 cm and a root length of 7.1 cm. In this period, the sixth variant, "Sadaf" variety, had a stem height of 24.7 cm and a root length of 6.1 cm. The dry mass of the stem was 2.1 g/plant and the dry mass of the root part was 1.4 g/plant.

In the first decade of the experiment (5.03) in the 30x10x4 scheme, the seventh option "Barley rice" variety, which was 20 days old, had a stem height of 21.8 cm and a root length of 6.7 cm. In the eighth variant, "Billur" variety, the height of the stem was 24.6 cm and the length of the root was 7.1 cm, the dry mass of the stem was 2.1 g/plant and the dry mass of the root part was 1.4 g/plant.

In the first decade of the experiment (5.03), rice seedlings planted in a 30x10x4 scheme, the ninth option "Iskandar" variety, which was 25 days old, had a stem height of 24.2 cm and a root length of 6.1 cm in the tillering phase. The ninth variant of the experiment, i.e., in the "Sadaf" variety, the height of the stem is 23.4 cm and the length of the root is 6.4 cm, the dry mass of the stem is 2.6 and 2.2 g/plant and the dry mass of the root part is 1.0 and 1.1 g /was observed to form the plant.

In the first decade of the experiment (5.03), the 25-day-old rice seedlings planted in the 30x10x4 scheme had a stem height of 24.8 cm and a root length of 7.1 cm in the tillering phase. The twelfth variant of the experiment, that is, in the "Billur" variety, the height of the stem is 24.3 cm and the length of the root is 6.8 cm, the dry mass of the stem is 2.9 and 2.6 g/plant, and the dry mass of the root part is 1.4 and 1 It was observed that it was 2 g/plant.

If we pay attention to the data in the table, in the same period, that is, in the first decade of March, rice seeds were sown in special cassettes and 20-day-old rice seedlings were 15, 25-day-old rice seedlings were planted as seedlings in the main field. It was observed that 4-3.0 cm high, dry mass accumulation of stem was more than 1.0 g/plant.

In the same period, i.e. in the first decade of March, rice seeds were sown in special cassettes and 20-day-old rice seedlings were planted in the main field compared to 15- and 25-day-old rice seedlings. It was observed that the dry mass accumulation of the stem was higher

ISSN 2181-0826 4/2024 y.

by 0.4-1.6 g/plant.

Summary. If we pay attention to the results of the research, in the same period, i.e. in the first decade of March, rice seeds were sown in special cassettes and 20-day-old rice seedlings were 15, 25-day-old rice seedlings were planted in the main field, and the length of the plant stem was 1, It was observed that 0-3.0 cm high, stem dry mass accumulation was 0.2-1.6 g/plant.

In the same period, i.e. in the first decade of March, rice seeds were sown in special cassettes, and 20-day-old rice seedlings were 15, 25-day-old rice seedlings were planted as seedlings in the main field. cm tall, it was observed that the dry mass accumulation of the stem was 0.5-0.8 g/plant.

According to the results of the research, the best results were observed when rice seeds were sown in special cassettes in the first decade of March and 20-day-old rice seedlings were transplanted to the main field.

Literature

1. Decision of the President of the Republic of Uzbekistan dated February 2, 2021 No. PQ-4973 «On measures to further develop rice cultivation».

2. M.A. Ergashev, R. Tillayev, M. Sattarov «Collection of 100 books» Agrobank 2021. Pages 7-10

3. H.R. Jurayeva. Dissertation on the topic «Effect of improving the factors of rice cultivation in the seedling method on productivity». 2020. B. 5-6.

4. M.A.Ergashev, H.Jurayeva, Sh.Abduraimov, N.Komilova «Effect of soil environment in the cultivation of rice seedlings» Agrochemical protection and plant quarantine magazine #1. 2024. pp. 102-104.Ghosh DC, Singh BP. Crop growth radesho for wetland rice management. Environ and Ecol. 2005;16(2): P.446–449. [Google Scholar]

5. Dar MH, Singh S, Singh US, Zaidi NW, Ismail AM (2014) Stress tolerant rice varieties-making headway in India. SATSA Mukhaptra Annual Technical Issue 18: P.1-4.

6. Orazmetov K.K., Saimnazarov Yu.B., Kashkaboyeva Ch. ToshDAU, UzShITI, the influence of seedling thickness on productivity in the cultivation of rice as a main crop by the seedling method. Proceedings of the scientific-practical conference on the role of women scientists in the development of science and technology //Tashkent - 2012.Collection.B. 256-261.

7. Vrkos, F.K. Dinamice rustu a productivity blarnich polnich plodin v prodycke biomassy of vorda vynosu plodin probu.CVTS.-1977.-V. 52.P. 13-23

8. Kostin V.I, Isayev, V.A., Kostin O.V. Elementy mineralnogopitaniya i rostregulyatory v ontogeneze selskohozyyastvennyx kultur. M.: Kolos, 2004. S. 201-209

9. Abdullayev A. Dissertation on the topic «Study of the effect of local and mineral fertilizers on yield and seed quality in the cultivation of rice by seedling method in Fergana Valley» 2007. B. 70-96.