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THE EFFECT OF PLANTING METHODS ON CHICKPEA CROP GROWTH AND YIELD ELEMENTS

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Abstract:

This article examines the dynamics of the growth of chickpeas grown on irrigated lands of the Samarkand region, the influence of the timing and sowing scheme on plant height and yield elements.

Keywords: experience, chickpea, sowing scheme, number of seeds, pod, yield, agricultural sphere, leguminous crops, compound feed, vegetative organ, growth rate, biological characteristics.

INTRODUCTION:

In order to provide the population of our republic with agricultural products, it is necessary to deepen reforms in the agricultural sector and create an effective system of measures aimed at ensuring food security.

In this regard, the most important task is to increase the production of leguminous crops with a high protein content, as well as ensure that animal husbandry is developed with high-calorie feed concentrates.

Because legumes are essential for increasing the yield of grain crops and soil fertility, their high yield, early maturity, disease and drought resistance, thick-branching, tall, non-shedding, protein-rich varieties suited for mechanized harvesting, and organization of agricultural technology introduction on a scientific basis is extremely important. Leguminous crops currently represent an opportunity for farmers to use vetch, chickpeas, and other legumes in short crop rotations on land of grain crops of our republic. [6].

Keeping leguminous crops in rotation with cereal crops increases soil fertility in cultivated areas, providing a higher level of nutrition for the population and also being environmentally friendly, as well as making it possible to produce more nutritious feed and hay.

The cultivation of leguminous crops together with grain crops is important in ensuring the grain independence of our republic. Legumes solve 3 tasks simultaneously. Firstly, it is considered an important factor in increasing grain production, secondly, it allows

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solving the feed problem in animal husbandry and, finally, thirdly, it is a source of increasing soil fertility [3-4].

Chickpeas occupy a special place among legumes.

The worldwide population growth results in an increase in the demand for food, especially protein-rich foods.

Our people consume chickpeas in a variety of ways, including the preparation of soups and second courses, as well as desserts and canned goods. Protein should be an average of 90-100 g in the food consumed by a person for 1 day. This is 12% of the daily calorie content of food.

It was mentioned in Abu Ali Ibn Sina's book "The Laws of Medicine" that chickpeas have healing properties and are the best in terms of lung nutrition. The oil is used for shingles, bad wounds, itching, and the soaked water is helpful for toothache, gum swelling and kidney stones, as well as other similar healing properties. In France and the UK, it has been found that it has a positive effect in the treatment of intestinal diseases, against diarrhea, and in the treatment of genitourinary organs. Furthermore, malic, citric, and oxalic acids extracted from chickpeas' pods and leaves are widely used as medicines throughout Southeast Asia, India, China and Burma. [1-3].

There is a lot of nutritional value in chickpea seeds, with about 30% protein, 47-60% starch, 4-8% fat, 2.3-5% ash, as well as a variety of vitamins. It is comparable in strength and nutritional value to cattle meat. [6].

In addition, many years of research have shown that 1 kg of animal protein requires 5-7 kg of vegetable protein and even 8-9 kg of vegetable protein. The loss of nutrients during their preparation is 20-30%. This will result in a protein deficiency. According to zootechnical standards, one energy feed unit (EPA) should contain 110-115 g of digestible protein. There are currently 85 grams of digestible protein in one feed unit used in animal husbandry.

The symbiotic relationship between Mezorhizobium ciceri and Mezorhizobium mediferraneum enables chickpeas to fix nitrogen symbiotically in their roots, providing 8-10 tons of fertilizer for the soil during the growth period.

The demand of our people for chickpeas is growing day by day. Therefore, in agriculture, such important problems as planting chickpeas on irrigated lands, obtaining a plentiful harvest, and increasing soil fertility are waiting for their solution. To solve such problems, the influence of sowing dates and schemes on the growth, development and yield of chickpeas on irrigated lands was studied.

Chickpeas are one of the most widespread ancient cultures in the world, and its homeland is India. Currently, chickpeas are widely grown in India, Turkey, Canada, Pakistan, Australia, Mexico. Another country that grows chickpeas is the USA. In 2001,

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chickpeas were planted on 134,000 acres in the United States. According to N. N. Balashova (2003), chickpeas are grown in the largest amount in India. In 2001, 71 million tons of chickpeas were grown in the world, that is, 60% of them accounted for the contribution of India [1-3].

In our republic, chickpeas are grown on arid lands. On arid lands, chickpea yields are low, 0, 3-0, 5 t/ha. In some dry years, the chickpea harvest does not even cover the cost of seeds when planted in arid areas. In subsequent years, many scientific studies were conducted on the possibility of growing chickpeas on irrigated lands (Khamdamov et al., 2001, 1992-1999, 2002-2003-2005), Mavlanov (2005), Yuldasheva (2002), Abdiev (2008).), Mirsharipova (2009), etc.) [4-5].

According to these scientists, chickpea crops on irrigated lands can produce 2,4-3,2 t of seed per hectare. However, in promising chickpea varieties for various soil and climatic conditions, one of the important agrotechnical elements of chickpea cultivation on irrigated lands - optimal timing and planting schemes - has not been studied enough. For this reason, determining the optimal planting dates and schemes of chickpea varieties recommended for planting on irrigated lands, and recommendations for their production are among the urgent tasks awaiting solution.

In vascular plants, legume-grain plants, including chickpeas, the upper part of the stem of the aboveground vegetative organ does not end with a flower, so chickpeas can grow for a long time, not limited to favorable environmental conditions. In plants, under the influence of environmental factors, i.e. with a decrease in soil moisture and an increase in air temperature, as well as with the beginning of the generative phase of plant development, the growth rate (speed) decreases significantly. It has been observed that the growth rate of a plant is more influenced by light, heat and humidity than by external environmental factors [5].

It is known from the literature that the growth rate of the chickpea plant depends on the biological characteristics of the varieties, soil moisture availability, methods and timing of sowing chickpea culture. According to O.I.Uzhanova, L.E.Tarasova (1989), the height of the AzNIIZ-303 variety, zoned in the Research Institute of Agriculture of Azerbaijan, reached 85 centimeters under irrigation conditions. According to I.Khamdamov, N.J.Khodzhaeva, S.B.Mustanov (2005), the height of the chickpea plant depends on the planting dates. They showed that early spring chickpea varieties were higher than late varieties [4].

It is known from the literature that the growth rate of the chickpea plant depends on the biological characteristics of the varieties, the moisture availability of the soil, the method and duration of sowing the chickpea culture [1,2]. According to I.Khamdamov, N.J.Khodzhaeva, S.B.Mstava (2005), the height of the chickpea plant depends on the planting dates. They showed that chickpea varieties planted in early spring had a higher

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plant height than those planted late. In our republic, chickpeas are grown mainly on arid lands. However, the yield of this crop is very low, only 0,6-0,7 t/ha [1-3]. The cost of seeds is not even covered in some dry years. The demand of our people for chickpeas is growing day by day. Therefore, in agriculture, such important problems as planting chickpeas on irrigated lands, obtaining a plentiful harvest, and increasing soil fertility are waiting for their solution. In recent years, some work has been carried out in this direction.

Field experiments were conducted on serozems soils of the Samarkand region. The area of the experiments is 1875.2 m^2, estimated 1800 m^2, the area of 1 plot is 25 m^2, carried out in four repetitions. During the experiment, chickpeas were watered 3 times in the phases of vegetation (growth period), budding and general flowering. 600-700 cubic meter of water per hectare was given for each irrigation. Chickpeas were planted at a row spacing of 60 cm, while seedlings in the row were spaced at a row spacing of 3, 6, and 9 cm. Chickpea seeds are planted in the soil to a depth of 3-4 cm . In our experience, chickpea varieties Yulduz, Uzbek - 32 and Umid were used as objects, and the dates of early spring planting were February 23, March 5, March 15, March 25, April 5, and according to the planting schemes, the row spacing was 60 cm, and the distance between seedlings in a row of 3, 6, 9 cm were variants have been obtained. To determine the growth rate of chickpeas, every 10 days, the height of plants was measured by 25 modules according to the repetition of all variants after the formation of grass.

Chickpeas, like other legumes, have an aboveground vegetative organ that does not end with a flower, so they can grow for a long time even in unfavorable conditions. In plants, under the influence of environmental factors, i.e. with a decrease in soil moisture and an increase in air temperature, as well as with the beginning of the generative phase of plant development, the growth rate (speed) decreases significantly. It has been observed that the growth rate of a plant is more influenced by light, heat and humidity than by external environmental factors [2,3,4].

The growth rate in all three varieties was slow in the first ten days of the initial growth period, then accelerated until the budding period.

For example, in the Yulduz variety, with a planting scheme of 60x3 cm on February 23, the increase for the first decade from March 20 to March 30 was 7.9 cm, for the second decade from March 30 to April 10 - 9 cm, and 10 in the third decade from April 10 to 20. 8 cm increased to 12.6 cm in the fourth decade from April 20 to 30. In the next ten days, i.e. during the period from the pod phase to the seed ripening phase, the growth pattern slowed down. For example, from April 30 to May 10, there was an increase of 10.9 cm, from May 10 to May 20 — 8.8 cm, from May 20 to May 30 — 5.9 cm, from May 30 to June 10 — 2.1 cm. A similar pattern was observed for all terms and schemes of sowing.

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According to the planting schemes, the highest growth pattern of the plant was noted in the variant planted according to the 60x3 cm scheme, at all times.

When analyzing the growth rate by varieties, the highest speed was noted in the Umid variety, 11.9 cm for the decade from April 30 to May 10, when sowing on February 23 in the planting scheme 60x3 cm, in the Yulduz variety 11.1 cm, in the Uzbek variety 32 11.6 cm formed.

When we observed the effect of time and planting patterns on plant height, plant height decreased as the planting time was delayed. For example, the tallest plant of the Yulduz variety was observed on February 23 in a 60x3 cm planting pattern. The average height of this planting scheme was 73.5 cm. When planting on March 5, it was 70.8 cm; on March 15, 68.4 cm; on March 25, 66.1 cm; on April 5, 63.9 cm; and on April 15, 62.1 cm. It was noticed that the height of the plant was 11.4 cm less during the planting period at the end of April 15 than the height of the plant during early planting on February 23. The highest indicator of varieties was noted in the sample of the Umid variety when planting on February 25 in the 60x3 cm planting scheme and averaged 84.2 cm, or 10.7 cm higher than the Yulduz variety, and 3.4 centimeters higher than the Uzbekistan-32. It is noticed that the height of the plant decreases not only depending on the timing of planting, but also on the planting scheme, i.e. from the expansion of row spacing. For example, the height of the Yulduz variety, planted on February 25, with a 60x3 cm planting scheme was 73.5 cm, with a 60x6 cm planting scheme - 71.4 cm, with a 60x9 cm planting scheme - 68.3 cm.

It is known that one of the indicators of productivity is the formation of buds, flowers and pods (E.I. Polikarpova 2008). A study of such indicators in the studied varieties, including budding, flowering, pods and pods stored before harvest, was conducted according to the sowing scheme on March 5, which indicated that budding occurs from May 13-14-15, flowering occurs from May 26-27-28, and pods are ripe by June 23-25-27.

The formation of generative organs according to planting schemes, the largest number of buds, flowers, pods and preserved pods on the plant was noted with a planting scheme of 60x9 cm. According to this planting scheme, the Umid variety produced an average of 7, 6, 8 buds, 73.2 flowers, 68.1 pods, and 63.9 preserved pods for average three years. When we observe the formation of generative organs in the main and lateral and upper and lower tiers of the plant, then on the main branch 32.6 buds, on the lateral branch 44.2, flowers 31.3, 71.7; pods were equal to 29.9, 38.2 grains. The number of preserved pods is 26.6, 37.3 pcs. So, in comparison with flowers, it was noted that the pods on the main branch are less by 6.0, on the lateral branch less by 6.9, in total less by 12.9. When we came to the analysis of the lower and upper layers, it was noted that the largest number of buds, flowers, pods formed in the lower layer. For example, the number of buds in the upper tier was 47.6, flowers in the upper tier 44.2,

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pods in the upper tier 46.2 and 27.0, pods 44.1 and 24.0, pods 42.6 and 21.3. In other words, it was noted that the number of buds in the lower layer is 18.4 more than the number of buds in the upper layer, the number of flowers is 19.2, the number of pods is 20.1, and the number of preserved pods is 18.4 more. 21.3. The number of buds, flowers, pods and stored pods on a plant decreased with decreasing distance between plants in a row. For example, with the 60x9 cm planting scheme, the total number of buds formed per plant was 76.8, flowers 73.2, pods 68.1 and stored pods 63.9, whereas with the 60x6 cm planting scheme, this indicator was proportionally equal to 73.1; 68.7; It was 64.2 and 60.0 units, or the number of buds formed with the planting scheme 60x9 cm, there were more buds in the planting scheme 60x3 cm by 3.7, the number of flowers by 4.5, the number of flowers by 4.5. pods, which is 7.2 more than the number of stored pods. The same pattern was noted in the varieties Yulduz and Uzbekistan-32. When analyzing the formation of generative organs by varieties, the highest indicators were noted in the Umid variety. For example, in this variety, the number of buds formed with a 60x3 cm planting scheme was 73.1, flowers 68.7, pods 64.2, preserved pods 60.0, whereas in the Uzbekistan-32 variety these indicators were proportionally 70.5; 65.4; 61.4 and 58.5 units. In comparison to the Uzbekistan-32, the Umid variety had more than 2.6 buds, 3.3 flowers, 2.8 pods, and also more than 1.5 stored pods. It has been observed that Umid variety had more than 9.2 buds, 9.6 flowers, 10.0 pods and 8.6 stored pods than the variety of Yulduz.

Conclusion

In all three chickpea varieties on February 25 during the planting period, the highest growth rate and height were observed with a planting scheme of 60x3 cm at all times, with the Umid variety having the highest indicator when analyzed by variety.

High rates of formation of generative organs by varieties were noted in the sample of the Umid variety, the number of formed buds with a 60x3 cm planting scheme was 73.1, flowers 68.7, pods 64.2, preserved pods 60.0. In comparison to the Uzbekistan-32, the Umid variety had more than 2.6 buds, 3.3 flowers, 2.8 pods, and also more than 1.5 stored pods. It has been observed that Umid variety had more than 9.2 buds, 9.6 flowers, 10.0 pods and 8.6 stored pods than the variety of Yulduz.

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Table 1: Formation of generative organs in chickpea varieties according to the planting scheme

Indicators formed in one plant (a piece)	Variety of Yulduz					Uzbekistan-32					Sample variety of Umid				
	Main stem	Secondary branches	Plant tier		General	Main stem	Secondary branches	Plant tier		General	Main stem	Secondary branches	Plant tier		General
			lower	upper				lower	upper				lower	upper	
Planting scheme 60x3															
buds	25.4	38.5	41.9	22.0	63.9	29.9	40.6	43.8	26.7	70.5	30.9	42.2	45.6	27.5	73.1
Flowers	23.5	35.6	39.4	19.7	59.1	28.8	36.6	41.1	24.3	65.4	29.0	39.7	43.5	25.2	68.7
Pods	21.8	31.4	36.5	17.7	54.2	27.1	34.3	38.8	22.6	61.4	27.3	36.9	41.7	22.5	64.2
stored pods	20.5	30.8	35.8	15.6	51.4	24.6	33.9	37.9	21.6	58.5	24.3	35.7	40.8	19.2	60
Planting scheme 60x6															
buds	26.6	39.4	42.3	23.2	65.4	30.4	42.2	44.3	28.5	72.8	31.5	43.2	46.4	28.3	74.7
Flowers	24.3	37.4	40.4	21.3	61.7	29.7	39.6	42.2	26.6	68.8	30.2	40.0	44.0	26.2	70.2
Pods	22.2	34.1	37.4	18.9	56.3	28.1	35.2	39.8	23.4	63.2	28.1	37.0	42.0	23.1	65.1
stored pods	21.1	31.4	35.1	17.4	52.5	25.2	34.0	38.0	21.1	59.2	25.2	36.4	41.5	20.1	61.6
Planting scheme 60x9															
buds	27.4	40.5	43.7	24.2	67.9	31.6	43.4	45.3	29.7	75.0	32.6	44.2	47.6	29.2	76.8
Flowers	25.2	38.1	41.2	22.3	63.5	30.2	40.3	43.1	27.4	70.5	31.5	41.7	46.2	27.0	73.2
Pods	23.1	35.2	39.0	19.3	58.3	29.1	36.2	40.0	24.3	65.3	29.9	38.2	44.1	24.0	68.1
stored pods	22.0	32.1	35.3	18.5	54.1	26.1	35.3	39.2	22.2	61.4	26.6	37.3	42.6	21.3	63.9