Comparative study of yield of winter wheat varieties

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Abstract. In the conditions of our country, it is an urgent task to provide the population with domestically grown wheat. In order to solve this problem, it is necessary to choose high-yielding wheat varieties with good grain quality, resistant to diseases and pests, suitable for the soil and climatic conditions of our country. is of great importance. In the article, this article was formed based on the data obtained from the experimental results of the comparative study of the growth, development and productivity of winter wheat varieties Chillaki, Kroshka and Tanya, and the appropriate conclusion was drawn. In addition, the duration of the development phases of winter wheat varieties was studied.

1 Introduction

Winter wheat is one of the valuable cereal crops, and flour is made from its grain, which is used to make bread, bakery products, pasta, vermicelli and other foods. Making bread from wheat flour is considered one of the greatest discoveries of mankind.

Increasing grain production in our country and increasing the productivity of irrigated areas is directly related to the planting of wheat varieties suitable for certain soil and climatic conditions, because winter wheat varieties cannot fulfill their internal productivity potential in the soil and climate conditions of all regions of our country.

If one variety shows the features of quick ripening, productivity, and resistance to diseases in a certain region, the opposite may happen in another region, or these features may not appear at all. For the same reason, breeders recommend a specific region for plants that are widely introduced. This is why mapping of plant varieties that are introduced to cultivated areas is carried out [1-4].

In recent years, a lot of scientific and research work is being carried out on the cultivation of winter wheat in Uzbekistan. In practice, many successes have been achieved in this field. In irrigated lands, varieties of winter wheat suitable for our soil and climatic conditions with high and high-quality yield have not been sufficiently cultivated.

Wheat bread contains a lot of protein and starch. Wheat bread is highly valued for its taste, nutrition and digestibility. The content of wheat grain is from 11.0% to 18-19% protein, depending on its variety and planting conditions. Protein digestibility from wheat bread is 95%. In addition, groats are made from wheat grains, and its flour is used in the pasta and confectionery industries. Wheat straw and chaff are fed to livestock, and waste produced

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during threshing is considered high-quality feed. In the technique, alcohol, starch, gluten, dextrin, glue and other various products are obtained from wheat grain. The quality of wheat grain, i.e., the content of protein and gluten varies depending on the soil and climate conditions of the region where wheat is grown [5-8].

In his article, the main factor in the intensification of agricultural production, the variety makes the following comments about the variety. Varieties adapted to local conditions play an important role in growing high, stable and quality crops from agricultural crops. There are two ways to increase the yield of agricultural crops, including winter wheat:

1. Creation of new varieties that have high productivity potential and can produce it even in the conditions of unfavorable factors of the external environment.
2. Improvement of the cultivation technology, that is, strengthening of the emergence of the potential possibility of the productivity of the variety through agrotechnical measures.

Both directions are inextricably linked, because the potential of a high-yielding variety is manifested in high agrotechnical conditions. In low agrotechnical conditions, the total productivity of a productive variety is slightly reduced, and its productivity approaches that of a low-yielding variety.

The increase in grain yield and total yield is due to the following.

1. Creation of new varieties suitable for local conditions and their introduction into production requires less money compared to the intensification of grain cultivation technology.
2. Varieties resistant to diseases and pests are created and put into production, it is ecologically safe, and money spent on plant protection is saved.
3. It bears fruit in the same year in the fields where the variety was created and put into production.

Therefore, the variety remains one of the main factors in the intensification of grain cultivation [9-14].

In connection with the task of achieving grain independence in our republic, increasing the productivity of winter wheat and the quality of grain, using the full potential of irrigated lands, is considered one of the most important tasks. In order to solve this problem, it is important to select wheat varieties with good yield and good quality of bread in local conditions. It is known that many winter wheat varieties have been imported from Russia in recent years in our Republic, and a number of winter wheat varieties have been created in our country. Testing these varieties in local conditions and studying their productivity qualities and making recommendations for production are considered to be the main tasks. [15-18]

In order to fulfill the above tasks, field experiments will be conducted in the following options.

- Option 1. Chillaki variety
- Option 2. Krushka variety
- Option 3. Tanya variety

Field experience is conducted in 4 kayaks. The area of each option in the experiment is 108 m2 (3.6 m x 30 m), of which the calculation area is 54 m2 (1.8 m x 30 m) and the number of plants is 25.

2 Materials and methods

During our research, the following research methods can be effectively evaluated: grouping, logical and comparative analysis methods, observation, abstract, logical thinking and other methods.

Observation calculations and measurements carried out in the experiment

1. Phenological observations. In the experiment, the passage of the main development periods of winter wheat is monitored. These observations are made according to the methodology of G. G. Gataulina and M. G. Ob'edkov. For this, a space of 0.25 m2 (0.50 cm x 0.50 cm) is allocated from the plot, and the periods of germination, budding, tuberization, spike flowering and ripening (wax and full ripening) of the counted plants (25) in this place are determined.
2. The stem growth rate is measured in flowering plants during the period of tillering, tuberization, earing, flowering and ripening.
3. Productivity indicators of wheat varieties were determined.
4. Wheat is harvested in a special combine in four kaitariks according to the grain type options, and it is analyzed by bringing it to standard humidity.

Economic efficiency of experimental options is calculated.

Observations are carried out on all stages of development of wheat planted in the experimental field from germination to ripening.

Achieving the required seedling thickness of winter wheat is one of the main factors of high yield. Seedling thickness was measured in 3 periods during the entire growth period. The first period is the pre-winter period, i.e., in the field of full germination, the second period is the period when the plant emerges from the winter in early spring, in the stage of full budding, and the third period is before the harvest of wheat, i.e., in the period of full ripening.

There was no significant difference between winter wheat seedling thicknesses measured before grass was fully harvested, after winter emergence, and before harvest. Crop quality is determined by the number of plants per unit area and the productivity of each plant. The productivity of each plant and the productivity of the field depends on determining the correct number of seedlings and planting method.

The main factors that determine the yield of grain crops are plant productivity and thickness. Therefore, it is important to determine the thickness of plants or the number of plants per unit area to assess the quality of crops.

The thickness of the plants is determined for the first time at the stage when the grasses have sprouted, before the establishment. Then it is possible to determine how full the lawn is, that is, the percentage of plants that have germinated compared to the seeds suitable for planting. The successful emergence of lawns, in turn, depends on how well the land is prepared from an agrotechnical point of view, on the thickness of planting, as well as on the influence of soil and meteorological conditions.

The degree of fullness of the grasses of grain crops sown on the ground is determined by dividing 4 plots of production or experimental crops, each of which is ¼ m2 in size. In each version of the experiment, two such fields are taken. If the field is large and the terrain is uneven, the number of calculation fields is increased. Counting plots are separated by diagonal intervals of the field or where the crops are even.

The number of lawns in the calculation areas is counted, the average amount is found for all the areas, and it is determined whether the lawns have grown out correctly.

3 Results and discussion

Winter wheat varieties planted in the experimental field were monitored at all stages of development from germination to maturity.

Achieving the required seedling thickness of winter wheat is one of the main factors of high yield. Seedling thickness was calculated in 3 periods during the entire growth period. The first period was carried out before winter, i.e. at the stage of full germination, the second period was the period when the plant emerged from winter in early spring, at the stage of full flowering, and the third period was before harvesting wheat. is in the period of full ripening.

Crop yields are determined by the number of plants per unit area and the productivity of each plant. The productivity of each plant and the productivity of the field depends on determining the correct number of seedlings and the method of planting.

In our experiment, the seedling thickness of wheat varieties was as follows.

Table 1. Seedling thickness of wheat varieties.

Varieties	**When the grass comes out, 1m2, pcs**	**When coming out of winter, 1m2, pcs**	**Before harvesting, 1m2, pcs**
Chillaki	422	393	382
Kroshka	428	401	393
Tanya	425	397	388

As can be seen from the data in the above Table, the germination of wheat varieties planted in the experiment is almost the same. In addition, it was observed that these varieties have the same resistance of plants to adverse conditions in winter.

After sowing the seeds of grain crops in the soil, the plant germinates, grows and develops until a new seed is produced, it goes through certain periods of individual development, i.e. periods when complete morphological changes occur and a new organ is formed.

After winter wheat is planted, a young stem that breaks through the seed coat grows above the ground, wrapped in a transparent sheath called a coleoptile. Because the tip of the coleoptile is sharp, the stalk of the cereal crop can easily reach the surface of the ground, while the coleoptile protects the stalk of the cereal crop from various damage in the soil. After the coleoptile reaches the surface and is exposed to the light, it stops growing and as a result of the push of the first leaf, it splits longitudinally and the first leaf emerges from the resulting crack. These first leaves are called grass.

After 3-4 leaves are produced on the stalk of cereal crops, the stalk stops growing for a short time or its growth slows down. In the same period, several joints close to each other are formed in the underground part of the stem. This joint is called a joint. Lateral stems grow from the joint of grain crops. This is called accumulation. The wheat cultivars planted in the experimental field will pass the tillering phase until the winter period. This stage begins with the formation of a swelling in the lower part of the stem and the completion of the tillering phase. If there is enough moisture in the soil, the tuber period will pass faster. Tubing is mainly characterized by the formation of joints, at this stage the height of the plant, the number of stems per 1 m2, the number of stems in 1 bush were measured and recorded in the observation book.

Harvesting of grain is considered the most important period of development from the point of view of production. This period is divided into a number of short periods (periods of grain milk and wax maturity), each of these periods indicates the degree of maturity of the grain. [19, 20]

In the experiment, all stages of development of winter wheat varieties from germination to ripening were taken into account.

Table 2. Development stages of wheat varietiesgross income.

Varieties	**Stagesofdevelopment**					
	Germination	**Congestion**	**Wrappingtheflute**	**Spike**	**Flowering**	**Ripe**
Chillaki	23.X	16.XI	18.03	17.04	22.04	2.06
Kroshka	23.X	18.XI	23.03	24.04	29.04	14.06
Tanya	23.X	19.XI	24.03	26.04	30.04	16.06

As can be seen from the data in the above Table, the seed germination of all varieties tested in the experiment was the same.

The accumulation phase started 2 days later in Kroshka and Tanya than in "Chillaki" variety.

In the experiment, the Chillaki variety of winter wheat entered the tuber phase 5 days earlier than the Kroshka variety and 6 days earlier than the Tanya variety. The earing phase started 7 days earlier in the Chillaki variety compared to the Kroshka variety, and 9 days earlier than the Tanya variety. In the experiment, the Chillaki variety of winter wheat ripened 12 days earlier than the Kroshka variety and 14 days earlier than the Tanya variety.

As can be seen from the above, the Chillaki variety of winter wheat entered all stages of development earlier than the Kroshka and Tanya varieties.

The biological quality of field-sown grain crops is determined near harvest.

The number of plants per unit area, their productive clustering, the number of grains in the ear, the number of grains in the furrow, and the weight of 1000 grains are considered the main indicators of biological yield.

In practice, in order to determine the biological yield, the field is divided into 1 m2 plots and plant samples are taken. The number of sample plants varies depending on the size and thickness of the plant. The obtained sample was weighed on a garden scale, then crushed and the weight of the grain was determined. Then the amount of moisture in the grain and straw is determined. The total weight yield and the separate yield obtained from straw and grain is determined and is calculated by adjusting the moisture content of straw and grain (the yield is calculated at 14% moisture) and converted into hectares.

To find out what elements the crop is composed of, it is necessary to analyze the garden of plants taken from the sampling sites and determine the composition of the crop. To determine the composition of the crop, it is necessary to know: the number of plants per unit area (1m2), their total and productive growth, the length of the spike, the number of spikes in it, the number and weight of grains in the spike, and the weight of 1000 grains.

The composition of the product is determined as follows. An area of 1 m2 is separated from different parts of the field where the plants are growing, the plants are dug up with their roots and tied into one or two bundles, and a label with relevant notes is hung. Plants in each garden, all stems and spiked stems are counted. The height of plants is measured (in 25 plants). After that, the roots of the plants are cut and weighed on a garden scale. 25 spikes are randomly cut from the garden, their length, the number of spikes in the spike, the weight of the grain are determined and the average size of this indicator is found. The tied sample plants are then threshed and the grain is removed (along with 25 spikes or grains from the bracts). The weight of 1000 grains is determined.

In agriculture, several factors affect the formation of a high and high-quality crop from grain, that is, the growth and development of the plant during the entire vegetation period also affects the formation of the grain crop. Based on the above, the grain structure of wheat was studied in our field experiment. [20,21]

In the experiment, a plant was plucked from an area of 0.25 m2 to determine the structure of the crop. Then the height, spike length, number of grains in 1 spike, number of productive stalks in 1 plant, 1000 grain weight, grain weight in one spike were determined.

Table 3. Productivity of wheat varieties.

Indicators	Chillaki	Kroshka	Tanya
1. Productive stalks per square meter, pcs	722	749	736
2. Height of the stem, cm	90.2	96.4	97.5
3. Spikelength, cm	8.6	9.3	8.9
4. The number of grains in one ear, pcs	39.3	43.2	41.3
5. Weightof 1000 grains, gr	39.8	42.6	41.2

As can be seen from the Table, the Kroshka variety is superior to other varieties in terms of the number of productive stems per 1 m2 of the area before harvesting. In terms of spike length, the number of grains produced in one spike, and the weight of 1000 grains, the Kroshka variety had higher indicators than other varieties.

In order to obtain a stable, abundant and high-quality grain harvest from winter grain crops on irrigated lands, extensive introduction of intensive technologies based on alternative irrigation, feeding regime and high agrotechnics into production, before planting each agricultural crop, to study its requirements for productivity and factors affecting this productivity. will be necessary. Application of scientifically based intensive technology allows to increase grain yield by 2-2.5 times.

The main task of field experiments conducted in agriculture is to scientifically substantiate the effect of the studied event or factor on plant productivity. Because productivity is the main criterion of agricultural production, the real goal of crop care is focused on increasing productivity per unit area.

Factors affecting the productivity of grain crops: first of all, the biological characteristics of the variety, planting in the most optimal periods, natural climatic conditions, the optimal planting method, period and rate, the rate and application period of nutrients, moisture supply, damage by diseases and pests, yield one of them is timely harvesting.

Table 4. Fertility of wheat varieties.

Varieties	Returns				Average, ts/h
	1	2	3	4	
Chillaki	56.4	58.2	55.6	57.5	56.9
Kroshka	61.2	63.4	62.6	64.2	62.8
Tanya	59.2	61.3	60.7	62.2	60.8

4 Conclusion

According to the data of this Table, 56.9 quintals of "Chillaki" variety, 62.8 quintals of "Kroshka" variety, and 60.8 quintals of "Tanya" variety were obtained per hectare. The variety "Chillaki" yielded less than other varieties, but ripened 12-14 days earlier than others. After the harvest of this variety, there were favorable conditions for planting repeated crops in its place. In short, in the soil and climate conditions of Popo district, it is advisable to plant "Kroshka" and "Tanya" for high yield of wheat, and "Chillaki" for early harvest. In the future, there are opportunities to further increase their productivity by perfecting the cultivation technologies of experimentally planted varieties.

We came to the following conclusions based on the results of our experiment on the study of winter wheat varieties on productivity indicators.

1. Chillaki, Kroshka and Tanya varieties of winter wheat grow well in our conditions, develop and collect enough harvest.
2. Among the varieties tested in the experiment, the Chillaki variety ripened 12 days earlier than the Kroshka variety.
3. Among the varieties tested in the experiment, it was observed that the Kroshka variety was superior to other varieties in terms of spike length, the amount of grain produced in 1 spike, and the weight of 1000 grains.
4. Taking into account that the productivity of the varieties planted in the experiment is good in our conditions, we suggest to continue the testing of the tested varieties and improve their care.

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