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Influence of Seed Sowing Times on the Biological Dry Mass Accumulation of Winter Barley (In the Conditions of the Central Region of Uzbekistan)

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A B S T R A C T
Barley (Hordeum vulgare L), a member of the grass family, is a major cereal grain grown in temperate climates globally. It was one of the first cultivated grains; it was domesticated in the Fertile Crescent around 9000 BC, giving it nonshattering spikelets and making it much easier to harvest. Its use then spread throughout Eurasia by 2000 BC. Barley prefers relatively low temperatures and well-drained soil to grow. It is relatively tolerant of drought and soil salinity, but is less winter-hardy than wheat or rye [1].

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In 2023, barley was fourth among grains in quantity produced, 146 million tonnes, behind maize, rice, and wheat. Globally, 70% of barley production is used as animal feed, while 30% is used as a source of fermentable material for beer, or further distilled into whisky, and as a component of various foods. It is used in soups and stews and in barley bread of various cultures. Barley grains are commonly made into malt using a traditional and ancient method of preparation. In English folklore, John Barleycorn personifies the grain and the alcoholic beverages made from it. English pub names such as The Barley Mow allude to its role in the production of beer [1; 5].

Research and methods.

Production.

In 2023, world production of barley was 146 million tonnes, led by Russia accounting for 14% of the world total (table). Australia, France, and Germany were secondary producers.

Worldwide barley production in 2023 was fourth among grains, following maize (1.2 billion tonnes), rice (800 million tonnes), and wheat (799 million tonnes)[2].

Table 1.

Barley production, 2023, millions of tonnes	
Russia	20.5
Australia	13.5
France	12.1
Germany	11.0

Turkey	9.2
Canada	8.9
World	**145.8**
Source: FAOSTAT of the United Nations	

Cultivation.

Barley is a crop that prefers relatively low temperatures, 15 to 20 °C (59 to 68 °F) in the growing season; it is grown around the world in temperate areas. It grows best in well-drained soil in full sunshine. In the tropics and subtropics, it is grown for food and straw in South Asia, North and East Africa, and in the Andes of South America. In dry regions it requires irrigation [3]. It has a short growing season and is relatively drought-tolerant. Barley is more tolerant of soil salinity than other cereals, varying in different cultivars [2]. It has less winter-hardiness than winter wheat and far less than rye [4].

Like other cereals, barley is typically planted on tilled land. Seed was traditionally scattered, but in developed countries is usually drilled. As it grows it requires soil nutrients (nitrogen, phosphorus, potassium), often supplied as fertilizers. It needs to be monitored for pests and diseases, and if necessary treated before these become serious. The stems and ears turn yellow when ripe, and the ears begin to droop. Traditional harvesting was by hand with sickles or scythes; in developed countries, harvesting is mechanised with combine harvesters [3].

SCIENTIFIC ANALYSIS OF RESEARCH RESULTS.

The object of the research.

As the object of the research, the irrigated typical gray soils of the Tashkent region, the "Bolgali" variety of barley, 5 different planting dates in Republic are considered.

Place of research, soil -climatic conditions.

Scientific research work was carried out in 2022-2023 in the Plant genetic resources scientific research institute. The Plant genetic resources scientific research institute is located in the upper reaches of the Chirchik River, at an altitude of 481 m above sea level, at 41011II north latitude and 38031II east latitude, in Kibrai district of Tashkent region. The experimental farm is 1500 meters away from the university yard, it is bordered by the Salar stream on the east side, the Boz - water channel on the west side, the hospital of Tashkent PTI on the south side, and the residential area on the north side. The soil of the experimental farm is a typical gray loam that has been irrigated for a long time. This soil contains 0.8 - 1.0% humus, about 0.058 - 0.089% nitrogen, about 0.141 - 0.184% phosphorus and about 0.154 - 0.148% potassium, which indicates that the nutrients used by the plant during the growing season are very small. . The soil is not saline. It differs in soil water permeability, softening complexity.

The main part of atmospheric precipitation occurs in the form of snow in the mountain region, and in the form of rain in the hilly and plain regions. Most of the precipitation falls in the winter and spring months, and a small amount falls in the autumn months. In the summer months, there is almost no rain. In autumn, the warm days last much longer, the air temperature slowly decreases. At the end of October or at the beginning of November, frost falls and the period of field crops stops. During this period, the amount of precipitation increases. In the experiment, the amount of precipitation was taken into account when implementing irrigation factors. This led to changes in the number and rate of irrigation over the years. In general, by analyzing the climatic conditions of Tashkent region, it is possible to conclude that this area is suitable for growing any type of agricultural crops, and the power of sunlight, the possibilities of artificial irrigation ensure the cultivation of high-quality crops from field crops.

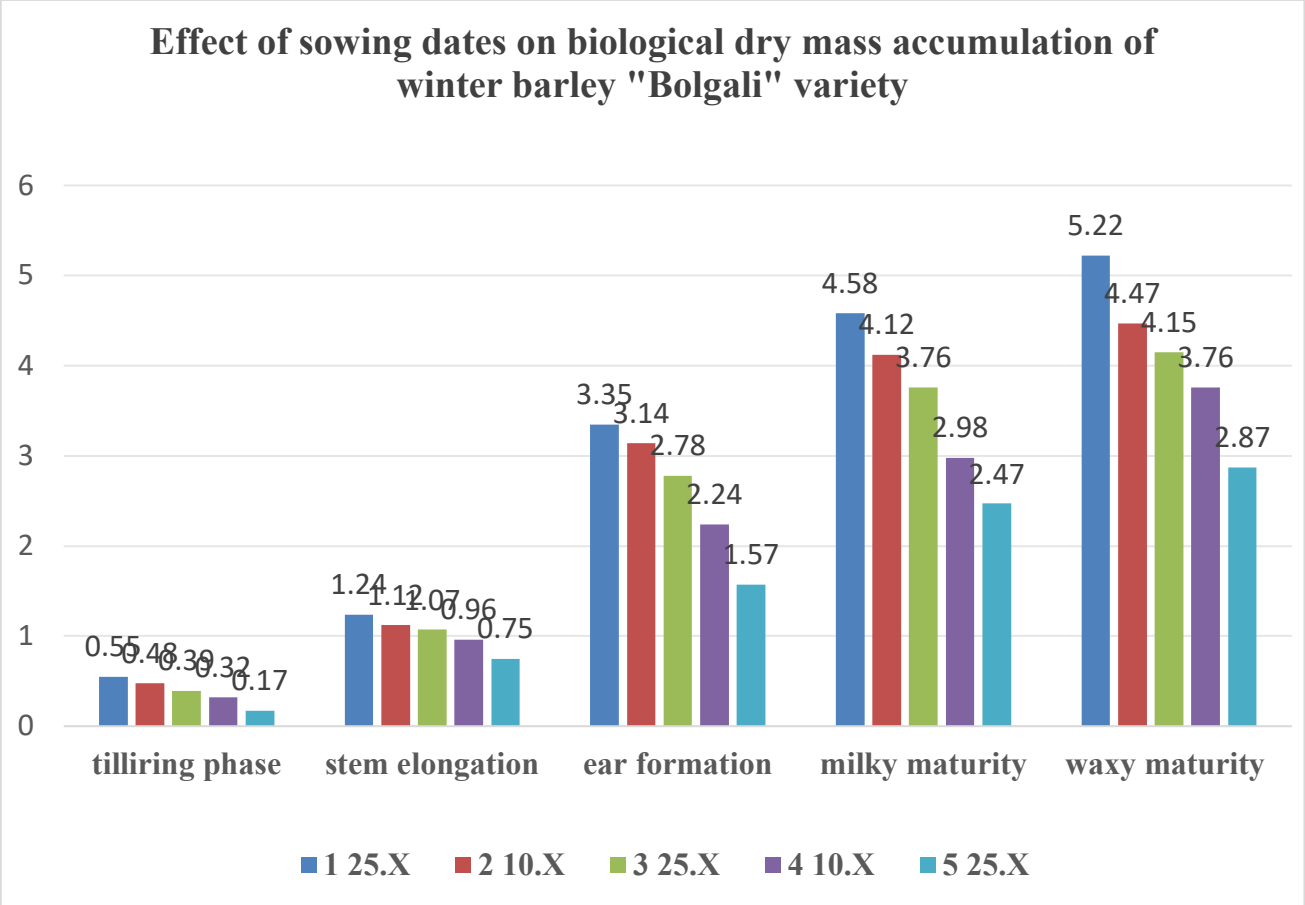
It is well known from foreign and domestic scientific literature and research conducted by scientists that the dry mass accumulation of agricultural crops is one of the main biometric indicators.

In the years of field experiments, observations were conducted on the variant cross-section to determine the effect of winter barley seeds sown at different times at a rate of 4 million seeds per hectare and the

applied agrotechnical measures on dry mass accumulation.

According to the results of the experiment, the seeds of the autumn barley "Bolgali" variety are 4.0 million per hectare in the period of September 25. It was determined that the indicators of biological dry mass accumulation of one bush of a plant, planted at the expense of germinating seeds (option 1), were as follows according to the development phases: 0.55 g in the budding phase; it was 1.24 g in the tuber phase, 3.35 g in the spike phase, 4.58 g in the milk ripening phase, and 5.22 g in the wax ripening phase.

In a scientific study conducted in field conditions, when seeds of the winter barley variety "Bolkali" were sown at the above seeding rate on October 10, the biological dry mass accumulation indicators per plant were 0.48 g in the accumulation phase; 1.12 g in the tuberization phase, 3.14 g in the earing phase, 4.12 g in the milk ripening phase, and 4.47 g in the wax ripening phase.



Discussion.

In the conducted experiment, the seeds of autumn barley "Bolgali" variety were planted on October 25 at 4.0 million per hectare. It was noted that the indicators of biological dry mass accumulation of one bush of a plant, planted on the basis of germinating seeds (option 3), were as follows according to the development phases. In particular, 0.39 g in the accumulation phase; it was 1.07 g in the tuber phase, 2.78 g in the spike phase, 3.76 g in the milk ripening phase, and 4.15 g in the wax ripening phase.

In a scientific study conducted in field conditions, when seeds of the winter barley variety "Bolkali" were sown at the recommended rate per hectare on October 25, the biological dry mass accumulation indicators per plant were 0.17 g in the accumulation phase; 0.75 g in the tuberization phase, 1.57 g in the earing phase, 2.47 g in the milk ripening phase, and 2.57 g in the wax ripening phase.

In the initial calculations, it was noted that the influence of different planting periods in the fall season on the accumulation of biological dry mass (in grams) of a plant in the "Bolgali" variety of autumn barley was significant.

In the next calculations, it was found that autumn barley "Bolgali" variety accumulates biological dry

mass per 1 ha. According to the analysis of the obtained data, it was observed that the effect of seeding periods on the accumulation of biological dry mass of the barley variety was significant according to the biological dry development phases of one hectare. The data obtained are presented in Table 1 below.

Table-1 Effect of sowing dates on biological dry mass accumulation of winter barley "Bolgali" variety

№ /рф	Sowing dates	Accumulation of biological dry mass in 1 ha area (centner/ha)				
		tilliring phase	steam elongation	ear formation	milky maturity	waxy maturity
1	25.09	18,37	41.58	107,31	137,23	158,55
2	10.10	16,24	38,77	95,35	115,61	131,46
3	25.10	13,38	34,21	78,65	96,75	118,53
4	10.11	10,97	29,37	63,48	82,35	98,51
5	25.11	06,12	7,42	44,67	65,17	81,37

From the results obtained from the experimental options, it can be seen that the dry mass accumulation of winter barley plants was significantly affected by the sowing period. When analyzing the 1st option, in which autumn barley seeds were sown on September 25, 4.0 million per hectare. In this variant planted with germinating seeds, the dry mass accumulation of the plant was 18.37 t/ha in the bud phase, 41.58 t/ha in the tuber phase, 107.31 t/ha in the spike phase, 137.23 t/ha in the milk ripening period of the ripening phase, and 158.55 t/ha in the wax ripening period.

When analyzing option 3, which was planted with germinating seeds 4.0 million per hectare on October 25, the dry mass accumulation of the plant was 13.38 t/ha in the bud phase, 34.21 t/ha in the tuber phase, 78.65 t/ha in the spike phase, 96.75 t/ha in the milk ripening period of the ripening phase, and 118.53 in the wax ripening period.

As can be seen from the above table 1, compared to the first planting period on September 25, the amount of dry mass accumulation of the plant during the fourth planting period (November 10) is: 7.40 t/ha in the bud phase, 12.21 t/ha in the tuber phase, 43.83 t/ha in the spike phase, 54.88 t/ha in the ripening phase and 54.88 t/ha. during the wax ripening period, it was a low amount of 60.04 ts/ha.

Conclusion. In field experiments conducted in the central region of Uzbekistan, the indicators of plant dry mass accumulation were studied in different development phases when barley, a cereal crop, was planted at different times.

In conclusion, it was noted that the effect of seeding periods on the accumulation of biological dry mass of winter barley "Bolgali" variety was observed and it changed organically depending on the applied agrotechnical measures.

It was determined that the amount of dry matter formed in plants per hectare decreased from 0,37 times to 0,78 times due to the delay of sowing dates.

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