

**UDC:633.12+631****EFFECT OF SOWING DATE, SEEDING RATE, AND PLANTING METHOD  
ON 1000-GRAIN WEIGHT AND GRAIN YIELD OF BUCKWHEAT UNDER  
IRRIGATED TYPICAL SIEROZEM SOIL CONDITIONS****Isroilov B.A.**

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**Abstract.** This study investigated the influence of sowing dates, seeding rates, and planting methods on grain quality and yield components of buckwheat (*Fagopyrum esculentum* Moench) cultivated as a second crop under irrigated typical sierozem soil conditions. The primary objective was to identify optimal agronomic practices for maximizing 1000-grain weight and grain yield.

The results demonstrated that grain plumpness and weight were fundamentally linked to the plant's nutritional area. The highest 1000-grain weight values (24.0-24.3 g) were consistently achieved under early sowing dates (June 20 and July 1) with lower plant densities, specifically in treatments using the single-row method at 1 million seeds/ha and the double-row method at 2 million seeds/ha. Across all planting methods, superior grain weight was associated with early sowing.

Conversely, the maximum grain yield of 22.4 q/ha was obtained under a high-density planting regime: sowing on June 20 using the triple-row method at a seeding rate of 3 million seeds/ha. This indicates a trade-off between individual grain quality (weight) and total yield per unit area, mediated by sowing date and plant density.

These findings provide a scientific basis for tailoring buckwheat cultivation strategies to specific production goals under irrigated semiarid conditions.

**Keywords:** buckwheat, second crop, sowing date, seeding rate, planting method, 1000-grain weight, grain yield, irrigation, sierozem.

**INRODUCTION**

Among grain crops, including buckwheat cultivation, the 1000-grain weight is considered one of the most important quality indicators determining productivity. Buckwheat is a significant goat crop, primarily cultivated for its grain. One of the most crucial elements of yield is grain plumpness, i.e., the 1000-grain weight [1,2].



In buckwheat cultivation, it has been established that grain plumpness and grain weight are dependent on the farm's soil and climatic conditions, the characteristics of the studied variety, and the applied agrotechnical measures. The experiment studied the effect of different sowing dates, seeding rates, and planting methods on the 1000-grain weight of buckwheat cultivated as a second crop under irrigated typical sierozem soil conditions.

In the methodological manual written by E.A.Gracheva and Yu.K.Grishanov [3], a new buckwheat variety named “Забава” is described. The authors studied the biological and economic characteristics of this variety, including its productivity, growth rate, and agrotechnical requirements. The research noted that the “Забава” variety is distinguished by its stable yield, adaptability to various climatic conditions, and high grain quality. Practical recommendations for cultivating this variety are also provided.

Furthermore, the comparative study of different buckwheat varieties and the positive influence of biotic and abiotic factors on plant productivity and product quality were investigated in the scientific works of Z.I.Glazova [4]. The data presented by the author emphasize that among the most important economic quality indicators of buckwheat are grain plumpness, uniformity, hull content, 1000-grain weight, and groat yield.

#### **MATERIALS AND METHODS**

The experiment was conducted in 2015-2017 in the the field of experimental plot of the Tashkent State Agrarian University. The soil of the experimental field is a typical sierozem, which has been irrigated for a long time, the mechanical composition is sandy, the groundwater is located at a depth of 15-18 meters.

The experiment studied the influence of different sowing dates, seeding rates, and planting methods on the growth, development, and yield of the buckwheat variety “Илишевская” cultivated as a second crop. Buckwheat seeds were sown at three dates (early -June 20, medium- July 1, late - July 10), using three seeding rates (1 million seeds/ha, 2 million seeds/ha, and 3 million seeds/ha), and three planting methods (single-row, double-row, and triple-row).

The research was conducted in the field and in the laboratory, including the placement of field experiments, calculations and observations “Methods of Conducting Field Experiments”, “Scientific Research Work in Plant Growing”, and “Методика полевого опыта” (B.Dospekhov, 1985) based on methodological guidelines [5; 6; 7].

**RESULTS**

According to the results of the experiment conducted under irrigated typical sierozem soil conditions, the effect of sowing date, seeding rate, and planting method on the 1000-grain weight of buckwheat was demonstrated. In the experiment, a relatively high 1000-grain weight of 24.0 grams was observed in the treatment where buckwheat seeds were sown on June 20 using the single-row method at a seeding rate of 1 million seeds/ha. In the treatment with a seeding rate of 1 million seeds/ha sown on July 1 using the single-row method, the 1000-grain weight was 24.3 grams, while in the treatment sown on July 10 with the same rate and method, it was 23.3 grams. It was observed that the difference in 1000-grain weight between treatments across sowing dates ranged from 0.3 to 1.6 grams.

In this treatment, it was determined that the 1000-grain weight of buckwheat plants was 0.4-1.0 grams higher compared to the other studied treatments. Under early sowing conditions on June 20 with a double-row method at 2 million seeds/ha, the average 1000-grain weight was 23.7 grams; when sown on July 1, it was 24.0 grams; and under conditions with a triple-row method at 3 million seeds/ha, it was 23.7 grams. A difference of 0.3 grams was observed between the double-row sowing treatments.

In the early sowing dates, it was noted that in the treatment with a triple-row method at a seeding rate of 3 million seeds/ha, the 1000-grain weight was 23.3 grams, which is 0.7 grams lower than the control treatment. The 1000-grain weight of buckwheat sown with a triple-row method at 3 million seeds/ha was 23.7 grams when sown on July 1 and 22.7 grams in the treatment sown on July 10 (Table 1).

**Table 1.**

**The effect of sowing date, seeding rate, and planting method on 1000-grain weight and grain yield of buckwheat (average 2015-2017)**

№	Variants			Weight of 1000 pcs of grain, gr	Yield, q/ha
	Sowing date	Seeding rate, million pieces/ha	Planting method		
1	June 20	1	the single-row	24,0	13,5
2		2	the double-row	23,7	19,8
3		3	the triple-row	23,3	22,4
4	July 1	1	the single-row	24,3	11,6



5	July 10	2	the double-row	24,0	16,1
6		3	the triple-row	23,7	18,8
7		1	the single-row	23,3	10,5
8		2	the double-row	23,0	14,6
9		3	the triple-row	22,7	15,9

When buckwheat was sown as a second crop in the early days of July, the 1000-grain weight ranged from 22.7 to 23.7 grams. In the experiment, relatively high 1000-grain weight indicators of 24.0-24.3 grams were recorded in variants 1, 4, and 5, where buckwheat was sown using the single-row method at 1 million seeds/ha during the relatively early period from June 20 to July 1.

In variant 5, sown in the early days of July using the double-row method at 2 million seeds/ha, this indicator was 24.0 grams. Under conditions where seeds were sown using the triple-row method at 3 million seeds/ha, the 1000-grain weight of buckwheat was 23.7 grams, respectively.

As can be seen from the table data presented above, in terms of grain yield indicators, buckwheat was observed in the variant sown with the single-row method at a seeding rate of 1 million seeds/ha. In these variants, grain yield was 13.5, 11.6, and 10.5 q/ha, respectively. In the variant where buckwheat seeds were sown with the double-row method at a rate of 2 million seeds/ha, grain yield across variants was 19.8, 16.1, and 14.6 q/ha. In the variant sown with the triple-row method at a rate of 3 million seeds/ha, grain yield across variants was 22.4, 18.8, and 15.9 q/ha.

**CONCLUSION.** It was noted that under irrigated conditions, the plumpness and weight of buckwheat grain sown as a second crop primarily depend on the plant's nutritional area.

In the experiment, relatively high 1000-grain weight indicators of 24.0, 24.3, and 24.0 grams were recorded under conditions where buckwheat seeds were sown as a second crop on June 20 and July 1 using the single-row method at a rate of 1 million seeds/ha and the double-row method at a rate of 2 million seeds/ha.

Across all studied planting methods, the relatively higher 1000-grain weight indicators for buckwheat were determined under conditions implemented during the early sowing dates of June 20 and July 1.



In the experiment, the highest grain yield indicator for buckwheat, 22.4 q/ha, was recorded in the treatment where buckwheat seeds were sown on June 20 using the triple-row method at a seeding rate of 3 million seeds/ha.

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