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THE EFFECT OF NUTRITION AREA ON THE AVERAGE FRUIT WEIGHT AND YIELD OF WATERMELON

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Annotation: The article presents data on the study of optimal feeding areas for obtaining high and high-quality watermelon yields in repeated periods in the soil and climatic conditions of the Kashkadarya region and the results obtained.

Key words: different planting patterns, variety, leaf, seeds, fruit height, width, fruit weight, watermelon, day, yield.

Аннотация: Ушбу мақолада Қашқадарё вилояти тупроқ иқлим шароитида такрорий муддатда тарвуз экинида юқори ва сифатли ҳосил олиш учун мақбул озиқланиш майдонларини ўрганиш ва олинган натижалар бўйича маълумотлар келтирилган.

Калит сўзлар: турли экиш схемалари, нав, барг, уруғ, мева баландлиги, эни, мева вазни, тарвуз, кун, ҳосилдорлик.

Аннотация: В статье приведены данные по изучению оптимальных площадей питания для получения высоких и качественных урожаев арбузов в повторных периодах в почвенно-климатических условиях Кашкадарьинской области и полученные результаты.

Introduction

Placing plants in the field serves as an important factor in maximizing the use of solar energy and creating optimal heat, water-air, and nutrient regimes.

This process must be carried out considering the biological characteristics of the crops. When arranging melon crops, it is necessary to correctly select the planting scheme — that is, the area of plant nutrition. Otherwise, the fruits of planted watermelons will not ripen simultaneously, and their marketability will decrease.

The optimal nutrition area depends on the crop type, variety, environmental conditions, and applied agrotechnics. The smaller the plant size, and the higher the soil fertility and agrotechnical level, the smaller the nutrition area of the plants can be, allowing more plants to be

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placed and achieving higher yields. At the same time, production costs per hectare decrease, ensuring greater profitability.

By selecting the appropriate row spacing and plant density — in other words, the optimal nutrition area — it is possible to significantly increase the yield of watermelon per unit area. [1]

Materials and Methods

There is information suggesting that high-quality and abundant watermelon yields can be obtained by cultivating watermelons in repeated sowing periods using rainfed (non-irrigated) methods. However, research determining optimal nutrition areas and planting schemes for such cultivation has not been conducted.

Based on this, the winter variety **"Khait Qora"** of watermelon was studied for determining the optimal planting scheme for non-irrigated, repeated cultivation using the following variants:

- Broadcast sowing (absolute control)
- (280+70):2×50 cm
- (280+70):2×60 cm
- (280+70):2×70 cm (control)
- (280+70):2×80 cm

Considering the purpose of the experiment, the southern region of Uzbekistan — Kashkadarya — was selected for watermelon cultivation during 2021–2023. The research aimed to determine the optimal nutrition area based on a new technology. The variety used — **Khait Qora** — is registered in the State Register of Crop Varieties of Uzbekistan and permitted for cultivation.

For repeated non-irrigated watermelon production, early vegetable and cereal crop fields freed after harvest were used.

Results and Discussion

To study the nutrition area of the "Khait Qora" variety, seeds in all variants were planted on June 20 using the pneumatic CANSA C-900 planter according to the planting schemes.

Germination results showed:

- 25% emergence occurred on day 5
- 75% emergence occurred on day 7

However, differences appeared among variants in the period from emergence to formation of the first true leaf:

- Control variants (280+70):2×70 cm and (280+70):2×80 cm: **3 days**
- (280+70):2×50 cm and (280+70):2×60 cm: **4 days**

• Broadcast (absolute control): **5 days**

This pattern continued during subsequent phenological phases.

The period from emergence to technical ripening was:

• Broadcast sowing: **125 days**

• (280+70):2×50 cm and (280+70):2×60 cm: **121 days**

• (280+70):2×70 cm and (280+70):2×80 cm: **120 days**

Thus, the larger the nutrition area, the shorter the fruit-ripening period. Conversely, smaller nutrition areas slightly prolonged the vegetation period. In short, planting density affects vegetation duration.

In the second variant (280+70):2×70 cm (control), the duration of the phenological phases from complete seedling emergence to the "flowering–fruit formation" stage was observed to be 2 days longer in the second variant (280+70):2×50 cm and 2×60 cm of the third variant, while in the scattered (absolute control) variant it was delayed by 6 days, according to our experiments.

The final analysis of the duration of phenological phases among the studied variants for determining the optimal planting density in intensive watermelon cultivation showed that as the feeding area increased, the ripening of watermelon fruits and the harvesting period shortened. Conversely, a reduction in the feeding area led to a slight extension of the vegetation period of the watermelon plants. In other words, planting schemes affect the duration of the vegetation period in watermelon cultivation.

During repeated experiments, different feeding areas in intensive watermelon cultivation significantly influenced the average fruit weight and yield. In the absolute control or scattered variant, the average yield was 24.5 t/ha. As the feeding area was properly defined, the yield increased (Table 1).

Table 3.2

Yield indicators of the "Khait Qora" watermelon variety grown under different planting schemes, 2021–2023.

Variants	**Total yield over years, t/ha**				**Relative to control period, %**	**Marketable yield, %**	**Average fruit weight, kg**	
	2021	2022	2023	Average			2021	2022

Scattered (absolute control)	2 2.4	5.6	2 5.6	2 4.5	100. 0	Scatt ered (absolute control)	2.4	2 5.6
(280+70):2 ×50 cm	2 6.3	8.2	2 9.8	2 8.1	114. 5	(280 +70):2×50 cm	6.3	2 8.2
(280+70):2 ×60 cm	3 4.2	5.6	3 5.9	3 5.2	143. 6	(280 +70):2×60 cm	4.2	3 5.6
(280+70):2 ×70 cm (control)	3 3.1	2.9	3 3.2	3 3.1	134. 8	(280 +70):2×70 cm (control)	3.1	3 2.9
(280+70):2 ×80 cm	2 6.2	8.1	2 8.6	2 7.6	112. 6	(280 +70):2×80 cm	6.2	2 8.1
ECTF 05 t/ha	1 .22	.98	0 .97	1. 07		ECT F 05 t/ha	.22	0 .98
Sx, %	0 .30	.23	0 .22	0. 25		Sx, %	.30	0 .23

In particular, in the (280+70):2×50 cm scheme, the yield reached 28.1 t/ha, which is 114.5% relative to the absolute control. Compared to the control, this is 3.6 t/ha or 14.5% higher.

Although the yield indicators varied across different feeding areas, the highest yield of 35.2 t/ha was obtained in the (280+70):2×60 cm scheme, followed by 33.1 t/ha in the (280+70):2×70 cm scheme. These values are 143.6% and 134.8% higher than the control variant, respectively.

For marketable yield, the variants with increased feeding areas showed higher results compared to the control. In the control variant, this indicator was 91.6%, while in the fifth variant it reached 99.0%.

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Depending on the experimental variant, the marketable yield accounted for 91.6–99.0% of the total yield. Over the years, the average total yield had a minimum significant difference at a 5% probability level (ECTF05) of 1.07 t/ha. The experimental precision (Sx, %) was 0.25%. Initial data indicate that the feeding area has a significant impact on the marketable quality of the yield.

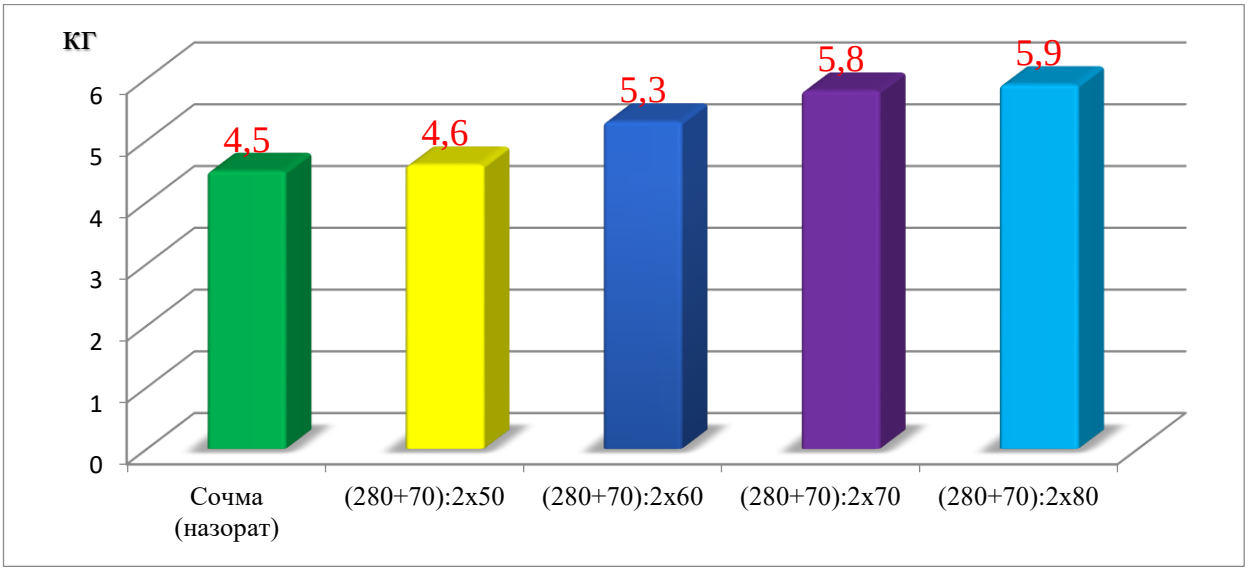

Figure 1. Effect of different planting schemes on the average fruit weight of watermelon, 2021–2023.

The feeding area or planting scheme significantly affects fruit weight. As the feeding area increases, fruit weight also increases (Figure 1).

In the control variant with scattered planting, the fruit weight was 4.5 kg, while in the (280+70):2×60 cm scheme it reached 5.3 kg. Conversely, as the feeding area expanded, fruit weight continued to increase. In the fifth variant (280+70):2×80 cm, fruit weight reached 5.9 kg, which is 1.4 kg higher than the control variant.

Conclusions

1. Initial data indicate that the feeding area has a significant effect on the marketable quality of the yield.
2. The feeding area or planting scheme significantly affects fruit weight. As the feeding area increases, fruit weight also increases.
3. Conversely, as the feeding area decreases, fruit weight decreases as well.

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