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PRODUCING, STORAGE AND PROCESSING OF MELONS USING MODERN RESOURCE-SAVING TECHNOLOGIES

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Abstract
In this article, the results of the research carried out in the field of cultivation, storage and processing of rice crops using modern resource-saving technologies are written with an in-depth scientific analysis. Also, the article provides scientific conclusions and advice for production industries.

Keywords: melon, watermelon, variety, hybrid, seedling, phenophases, drip irrigation, mulching.

Introduction

In recent years, the climate is changing dramatically, the need for water is increasing, as well as the occurrence of black frosts in the early spring, which are more than normal, are creating some difficulties for our farmers in growing melons crops. Taking all this into account requires the implementation of agronomic practices such as mulching and drip irrigation to regulate soil temperature, moisture content, weed, pest and disease control.

The effect of mulch color on yield has been studied in several crops, including tomato and squash [7]. However, not enough studies have been conducted to investigate the effects of mulching types and color of mulching materials and drip irrigation methods on growth parameters and yield of melon and watermelon crops.

Therefore, considering the importance of mulching in the cultivation of various vegetable crops, we conducted this research to investigate the effect of different mulching materials and drip irrigation method on the growth parameters and yield of watermelon plant. Also, in our research, we studied the technology of storage and processing of melons and watermelons grown using this resource-saving technology.

Research Methodology

We conducted our research on the cultivation, storage and processing of melons (melon and watermelon) crops using modern resource-saving technologies. Field experiments with the purpose of growing rice crops by using different mulching materials and drip irrigation were conducted in 2022 “Center for Innovative Developments and Consultations in Agriculture” DUK pilot farm. All experiments in our research were carried out using watermelon varieties “Shirin”, “Sharq Ne’mati”, hybrid “Dolby F_1” and fruits, melon varieties “Kichkintoy”, “Kok Tinni 1087”, “Kokcha – 588” and “Oq urug – 1157” and fruits increased.

During the planting of melon and watermelon seedlings, the reserves of moisture in the soil layer were 80-85% in the field of the experimental farm. Soil temperature (soil thermometer), number of seedlings, phenological observations and biometric measurements, irrigation method, duration (according to V.E. Kabaev's zuldar method) and number, yield amount, weight of leaf surface and leaf stems, root weight, chemical composition of watermelon fruit, economic efficiency of the crop were studied.

We conducted our studies in the field of melons crop preservation in the watermelon plant, and our research in the field of processing in the melon plant. These experiments were conducted at the experimental field of Tashkent State Agrarian University and at the private enterprise of RedPak LLC, which is located in the Mirzaabad district of the Syrdarya region, and is designed for the storage and processing of rice products.

Research Results

The results of our research to investigate the effect of different mulching materials on the growth parameters of melon and watermelon plants showed that different types of mulching materials had a significant effect on the growth parameters of melons crops,

namely the number of side branches per stem, the length of the main stem, the total number and surface of leaves, number of whorls per stem, fruit weight and plant weight varied with mulching materials. Among the mulching methods, black polyethylene treatment resulted in an increase in the number of branches per stem, an increase in the length of the main stem and the number of curls per stem, and an increase in fruit and plant weight compared to the control and white mulch options (Table 1).

The control option showed the least increase among the study options. Availability and prolonged retention of moisture resulted in higher absorption of nutrients for proper plant growth and development, which resulted in higher growth parameters of plants in mulched land compared to the control.

The highest stem length under black mulch is due to higher nutrient uptake due to favorable soil moisture and reduced soil moisture evaporation rate caused by mulching the soil surface in watermelon rows. Mulching with black polyethylene film was found to significantly affect stem length more than other mulching materials. This mulch consistently increased germination over other mulches. This may have been due to the favorable soil temperature, moisture conditions and the dramatic reduction in pests and diseases caused by the black mulch.

Table 1 Effects of different mulching materials on growth parameters of melon and watermelon plants (2022 year)

Experience options	Varieties and hybrids	Number of lateral branches, pcs	Main stem length, cm	The number of curls in one bush, pcs	The number of leaves in one bush, pcs	Leaf level, dm^2	Fruit weight, kg	Weight of one plant, kg
Control (no mulch)	**Melon**							
	Kichkintoy	5±1,2	154±1,8	3±	353±48	1882±62	0,8±1,0	0,9±0,13
	Kok Tinni 1087	5±1,0	172±3,5	4±	385±54	1857±57	3,0±1,4	1,24±0,17
	Watermelon							
	Shirin	6±1,2	214±3,2	3,7±	521±52	2590±80	5±2,7	1,11±0,23
	Sharq Ne'mati	6±2,0	227±3,8	3,6±	524±50	2832±70	7±3,8	1,27±0,25
	Dolby F_1	7±1,9	256±3,7	4,1±	511±42	2937±90	8±3,5	1,56±0,23
Black mulch	**Melon**							
	Kichkintoy	5±2,8	171±3,3	5±	372±65	1890±33	1,1±0,2	1,12±0,17
	Kok Tinni 1087	6±2,4	190±3,6	6±	412±73	1927±45	4,3±0,6	1,42±0,27
	Watermelon							
	Shirin	7±2,1	241±3,6	3,7±	541±52	2651±66	5±2,3	1,32±0,28
	Sharq Ne'mati	8±2,4	243±3,7	4,3±	570±40	2899±75	8±3,0	1,55±0,23
	Dolby F_1	8±2,1	296±4,8	4,4±	528±54	2998±66	9±3,7	1,92±0,20
White mulch	**Melon**							
	Kichkintoy	6±2,7	183±5,5	5±	395±62	1912±32	1,6±0,8	1,24±0,23
	Kok Tinni 1087	7±2,5	199±3,4	6±	423±74	1936±54	4,0±1,2	1,43±0,27
	Watermelon							
	Shirin	6±1,7	232±2,3	3,8±	527±42	2638±42	5±2,2	1,38±0,30
	Sharq Ne'mati	8±1,9	239±3,5	3,9±	548±56	2862±70	8±3,7	1,47±0,27
	Dolby F_1	8±1,5	280±3,3	4,5±	526±49	2945±46	9±1,9	1,72±0,26

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The results of the experiment to determine the parameters of irrigation and the norm of fertilizing in the cultivation of melons (melon and watermelon) crops by drip irrigation showed this (Table 2).

Table 2 Characteristics of water regime parameters in watermelon cultivation by drip irrigation (according to the experimernt, A.Nishonova and K.Zokirov, 2022)

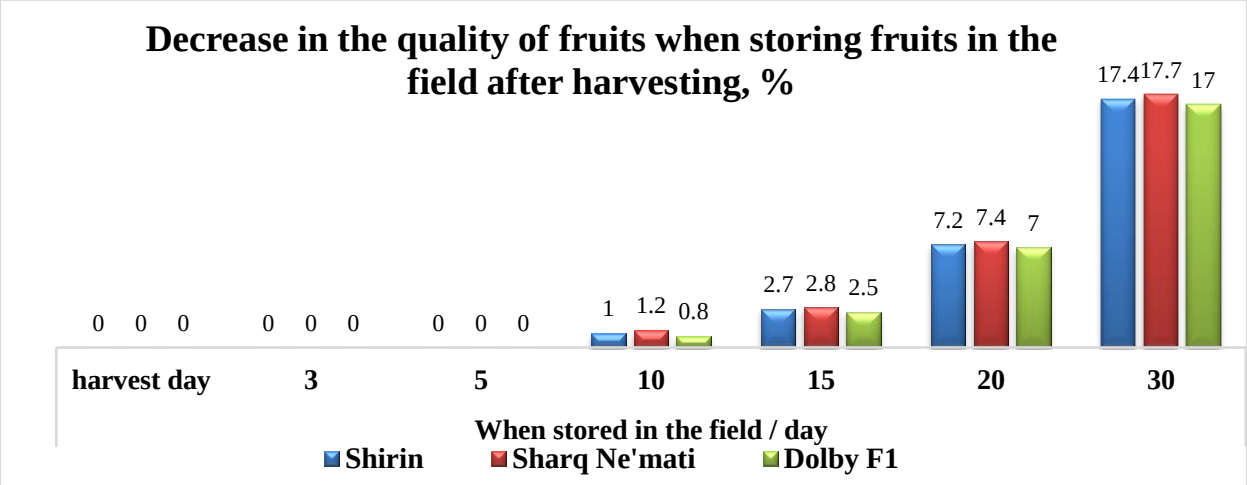
Plant type	Varieties and hybrids	Phenophases								Total number of irrigation, pcs	Irrigation rate, m³ / ha
		shatrik-stem formation		stem formation - flowering		flowering - fruit formation		fruit formation - ripening			
		Irrigation rate, m³ / ha	Number of watering, pcs	Irrigation rate, m³ / ha	Number of watering, pcs	Irrigation rate, m³ / ha	Number of watering, pcs	Irrigation rate, m³ / ha	Number of watering, pcs		
Melon plant	Kichkintoy	65.75.65% Soil moisture before watering									
		25	2	85	4	125	6	150	2	14	1440
		70.80.70 % Soil moisture before watering									
		25	3	85	5	125	7	150	2	17	1675
		75.85.75 % Soil moisture before watering									
		25	3	85	6	125	8	150	2	19	1885
	Kok Tinni 1087	65.75.65% Soil moisture before watering									
		25	2	85	4	125	6	150	2	14	1440
		70.80.70 % Soil moisture before watering									
		25	3	85	5	125	7	150	2	17	1675
		75.85.75 % Soil moisture before watering									
		25	3	85	6	125	8	150	2	19	1885
Watermelon plant	Shirin	65.75.65% Soil moisture before watering									
		31	2	95	5	135	7	170	4	18	2162
		70.80.70 % Soil moisture before watering									
		31	3	95	6	135	8	170	4	21	2423
		75.85.75 % Soil moisture before watering									
		31	3	95	7	135	10	170	4	24	2788
	Sharq Ne'mati	65.75.65% Soil moisture before watering									
		31	2	95	5	135	7	170	4	18	2162
		70.80.70 % Soil moisture before watering									
		31	3	95	6	135	8	170	4	21	2423
		75.85.75 % Soil moisture before watering									
		31	3	95	7	135	10	170	4	24	2788
	Dolby F_1	65.75.65% Soil moisture before watering									
		31	2	95	5	135	6	170	4	17	2027
		70.80.70 % Soil moisture before watering									
		31	2	95	5	135	7	170	4	18	2162
		75.85.75 % Soil moisture before watering									
		31	2	95	6	135	9	170	4	21	2527

The results of our research showed that among the 3 different irrigation parameters, the yield of melons and watermelons was higher in the variant where the soil moisture was maintained at the level of 70-80-70% than in the other variants. At the same time, the quality of ripe melons and watermelons stood out from the rest. In order to

maintain the average mode of this variant, watering was carried out 21 times in the watermelon varieties "Shirin", "Sharq Ne'mati", 18 times in the "Dolby F_1" hybrid, and 17 times in the "Kichkintoy" and "Kok Tinni 1087" melon varieties. Watermelon average varieties "Shirin", "Sharq Ne'mati" and the hybrid "Dolby F_1" combined with increased yield and fruit quality in the 70-80-70% option, compared to the 75-85-75% option, the number of watering is 3-4 times, total and the irrigation rate was less than 365 m^3/ha. These indicators make it possible to obtain a high yield and ecologically clean product from the melon and watermelon plant while using less water for our farmers at a time when the climate is changing sharply and water shortage is increasing.

According to the results of the study of the influence of storage conditions and periods on the quality of watermelon fruits, it was noted that the quality of watermelon fruits left in the field for 3-5 days did not change in the researched hybrids and varieties. After 10 days, this indicator of quality increased by 1.0% in the "Shirin" variety, by 1.2% in the "Sharq Ne'mati" variety, by 0.8% in the "Dolby F_1" hybrid, after 15 days in the "Shirin" variety by 2.7 %, in the "Sharq Ne'mati" variety by 2.8%, in the "Dolby F_1" hybrid by 2.5%, and after 20 days by 7.2 in the "Shirin" variety, in the "Sharq Ne'mati" variety by 7.4 %, it decreased by 7% in "Dolby F_1" hybrid. As the fruit remained in the field, the quality decreased by 17-17.4% on the 30th day (Graph 1).

The results of the experiment to determine the pulp yield of melons grown using different fertilizing standards showed that when the "Kokcha-588" and "Oq urug-1157" varieties of melons were grown in the non-fertilized (control) variant under different fertilizing standards, the flesh of the fruit was 82.4-82.6%, the pulp 12.8 – 13.0%, seed-placental 4.8 – 4.4% under conditions of mineral fertilizers ($N_{75}P_{75}K_{60}$ kg/ha), respectively 82.2 – 82.4; 12.8 – 12.9; It was 5.0-4.7%, and compared to the control variant, it showed an increase of 0.2% of flesh and pod, 0.2-0.4% of seed-placenta.



Graph 1. Decrease in the quality of fruits when storing fruits in the field after harvesting, % (K.Zokirov, 2022)

The most meat yield (83.6 – 83.4%), pod share (12.7 – 13.1%) and seed-placental weight (3.7 – 3.5%) studied melon varieties organomineral fertilizers ($N_{120}P_{80}K_{50}$kg/ga) was obtained when grown under conditions (Table 4).

Table 4

Weight of pod, seed-placenta and flesh in fruit when melon cultivars are grown under different fertilization rates (A.Nishonova, 2022)

№	Varietal name	Weight of fruit parts,%		
		meat	pod	seed - placenta (core)
No fertilizer (control)				
1.	Kokcha-588	82,4	12,8	4,8
2.	Oq urug-1157	82,6	13,0	4,4
$N_{75}P_{75}K_{60}$ kg/ha				
3.	Kokcha-588	82,2	12,8	5,0
4.	Oq urug-1157	82,4	12,8	4,8
$N_{120}P_{80}K_{50}$ kg/ha				
5.	Kokcha-588	83,6	12,7	3,7
6.	Oq urug-1157	83,4	13,1	3,5

According to the data, when the fruits of melon varieties obtained in conditions without fertilizers are dried, the yield of pulp compared to flesh is 9.0-12.0%, and the yield is 2.02-2.62 tons per hectare.

Conclusion

Generally speaking, the black mulching material and the option of 70, 80, 70% soil moisture before irrigation create favorable soil climate conditions for pulse crops, and mulching significantly reduces the evaporation of water resources in the soil and the number of weeds. Applying this mulching and drip irrigation practice allows our growers to have an environmentally friendly product, as well as a high yield, while observing the vagaries of the climate.

As for the technology of storage and processing of melons crops, when using the method of storing watermelon in the field and in a naturally ventilated warehouse, it is not economically beneficial to store the fruits of watermelon hybrids and varieties in the field for more than 15 days, after 20 days the quality is 7.0-7.4%, after 30 days and it was found that it decreased by 17.0-17.7%. Based on the above, if it is not possible to export the harvested watermelon on the day of harvesting, the harvested fruits can be stored in the field for up to 15 days. When melon fruits obtained under conditions of mineral fertilizers ($N_{75}P_{75}K_{60}$kg/ha) are dried, compared to the option without fertilizer (control), 0.2-0.7% dry matter, 2.1-2.8% total sugar, 3.1-3.9 mg/ It turned out that it contains a lot of vitamin C. Based on this, we can say that the biochemical

value of the product will be high when we process the melon fruits grown with fertilizer at the rate of $N_{75}P_{75}K_{60}$kg/ha.

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