International Journal of Scientific Trends- (IJST)
ISSN: 2980-4299
Volume 2, Issue 12, December, 2023
Website: https://scientifictrends.org/index.php/ijst
Open Access, Peer Reviewed, Scientific Journal

The Influence of Climatic Factors on The Biometric Indicators of Carrots

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Abstract
This article presents the results of tests of domestic and foreign varieties of table carrots in the desert soil – climatic zone of Surkhandarya region. The assessment of 22 varieties of table carrots on productivity and quality of the harvest is given.

Keywords: Table carrots, temperature, bolstering, root crop diameter, root crop length.

Introduction

The most important climatic factor affecting carrot cultivation is temperature. In addition to plant growth, temperature also affects the shape of the roots, their color and the growth of the green parts of the shoots. Carrots are mainly a temperate climate crop grown from spring to autumn in temperate countries and in winter in tropical and subtropical countries of the world, especially because they are resistant to frost at the germination stage and in the early growing period. The optimal temperature for growing carrots is between 15.6 and 21.1°C. Higher and lower temperatures negatively affect growth and reduce root quality. The date of sowing has an important impact on the growth, development and yield of carrots due to environmental factors such as temperature and light intensity. Consequently, factors affecting carrot yields also include the date of sowing, and this can play a crucial role in increasing the availability of carrots on the market at the beginning and end of the season [1].

Materials and Methods of Research

Field experiments were conducted at the experimental site of the Surkhandarya scientific Experimental Station of the Research Institute of Vegetable and Melon crops of potatoes, located in the southern part of the Surkhandarya region (37°13' North latitude; 67°16' East longitude, altitude 320 m above sea level) in the spring of 2020.

During the period of the experiments, the average temperature was 18.5±0.5°C, and the total amount of precipitation was 73 mm. The climate of the territory of the Termez district is subtropical inland, with sultry and hot dry summers and cold winters. The soils of the experimental site are gray–brown, ordinary medium-sized slightly loamy and slightly leached. In our research,

the experiments, records and observations were carried out according to the methodological guidelines [4, 5].

22 varieties of table carrots were taken for research: 13 of them were of domestic selection (Farovon, Mshak 195, Mirzo red 228, Nurli 70, Mirzo mshak, Cylindrical red, Cylindrical yellow, Zarcha red, Zarcha yellow, Ziynatli, Baraka, Mshaki surkh, Mirzo yellow 304) and 9 varieties of VNIISSOK (Russia) (Nadezhda F1, Minor, Marlinka, Margosha (Minchanka), Moscow winter A-515, Nant 4, Shantane 2461, Mars F1, Emperor).

The seeds were sown manually on February 20, 2020. The experiment was carried out without repetition. The area of the accounting plot is 2.8 sq.m. The location of the plots in two tiers. Phenological observations were carried out one at a time. The date of the beginning (10-15%) and full shoots (75%), as well as the beginning of full technical (commercial) ripeness, were noted.

Full technical ripeness was characterized by established and appropriate standards of root crops. Harvesting began as the root crops of each variety reached technical maturity, when at least 75% of the root crops reached the size of commercial ones.

The entire crop was sorted into marketable and non-marketable (sick, damaged, cracked, underdone, ugly and branched). Each fraction was weighed and the proportion of its content in the total crop of root crops from the plot was calculated.

Research results and their discussion

Carrots are a biennial plant of the celery family. It can be divided into two subspecies: eastern and western. The eastern subspecies has a purple or yellow root crop, pubescent leaves, a gray-green shade and a tendency to early blooming. In the western subspecies, the root crop has orange, yellow, red and white coloration, green leaves without pubescence and their ability to bloom appears only after undergoing the process of springization [3].

The optimal temperature for carrot growth according to the phases of development looks like this: during germination – 9-15 ℃, during leaf formation – 15-20℃, during the period of intensive root crop growth – 13-18 ℃. At spring sowing dates, the optimal sum of effective temperatures (above 10℃) leaves 2000-2100℃, and the minimum is 1500℃. At a temperature of 31-33 ℃, the intensity of root crop growth decreases by 3-6 times. At the same time, growth processes are inhibited, and the root crop prematurely matures and ages. When the soil temperature decreases to 10℃, growth is delayed, root crops have a less intense color, and their branching is observed [2].

The optimal temperature for the growth of carrots in the phases of development (shoots, leaf formation and during the period of intensive root crop growth) was below the permissible (for February 11.4℃, for March 13.8℃, for April 18.5 and May 25.0℃). In this regard, the yields of all varieties were low. Of the 13 domestic varieties, 9 (Farovon, Poppy 195, Mirzoi red, Nurli 70, Mirzoi mshak, Cylindrical yellow, Brocade red, Zarch yellow, Mshaki surkh) were subjected to shooting.

However, the yield indicators of other varieties varied significantly (Table 1). The values of yield indicators ranged from 3.2 t/ha for the Baraka variety to 1.5 t/ha for the Ziynatli and Cylindrical Red varieties.

However, the yields of other varieties varied considerably (Table 1). Yields ranged from 3.2 t/ha for Baraka to 1.5 t/ha for Ziinatli and Cylindrical Red.

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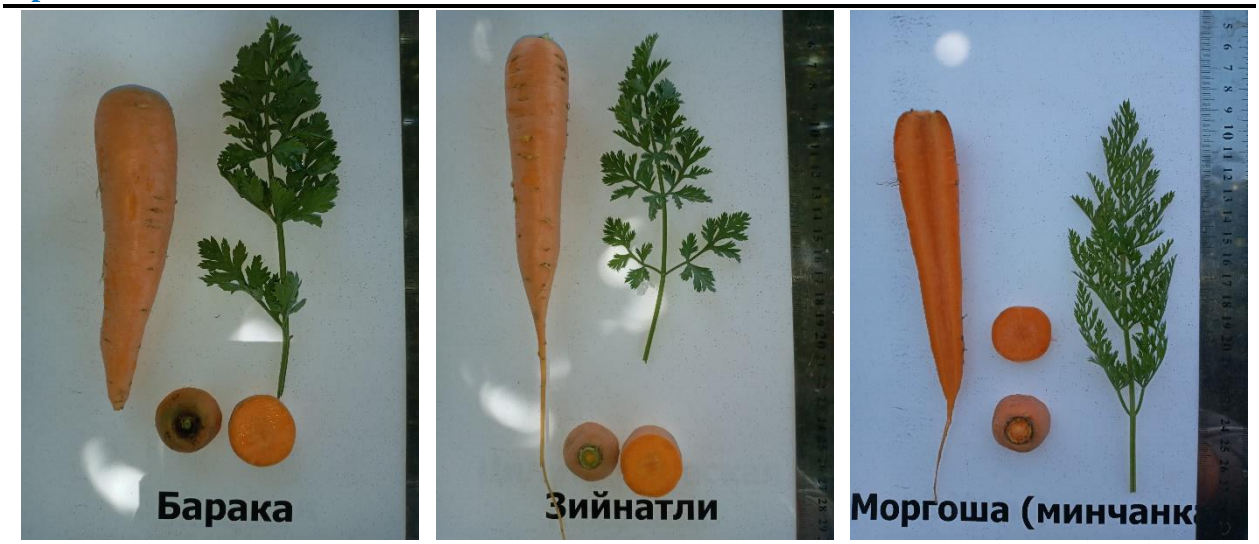
Economic characteristics of carrot varieties in the dining room

Sort	Yield t/ha	Marketability %	Mass Commodity root vegetable, gr.	Length root vegetable, cm.	Diameter root vegetable, cm.	Diameter Sertsovini root vegetable, cm.
Cylindrical Red	15	88,5	48,2	10,9	2,5	1,1
Zeenaly	15	88,8	40,6	11,0	2,5	1,1
Barack	32	90,7	38,2	11.4	2,4	1,0
Emperor	16	90,7	29,4	13,5	2,0	1,0
Minor	20	89,0	24,4	10,3	2,0	1,0
Moskovskaya Zimnaya A 515	19	90,0	40,5	10.5	2,7	1,7
Marlinka	20	87,0	34,2	9,2	2.6	1,4
Shantane 2461	23	92,5	39,8	9,6	2,9	1,7
Mars F1	15	84,5	28,6	11,2	2,2	1,2
Hope F1	19	92,8	27,6	12,0	2,1	1,0
Margosha	21	90,8	35,0	10,7	2,4	1,4
Nantes 4	18	89,0	27,2	11,0	2,2	1,0

The marketability of root crops is an important indicator for producers and consumers. Fluctuations in marketability by grades ranged from 84.5% (Mars F1 variety) to 92.8% (Nadezhda F1). The root crops have formed insufficiently large. The minimum weight of the root crop is 24.4 g in the Minor variety, the maximum is 48.2 g in the Cylindrical red variety. The minimum length of the root crop is 9.2 cm for the Marlinka variety, the maximum is 13.5 cm for the Emperor variety.

The quality of carrots intended for consumption must comply with the requirements and norms of GOST 32284-2013 “Fresh table carrots sold in a retail chain”. According to the requirements of GOST, the size of root crops by the largest transverse diameter (or by weight) it should correspond to: for early and small carrots – 1.0 – 4.0 cm (8.0-150.0 g); harvested before September 1 – 2.0 – 4.0 cm (20.0-150.0 g); after September 1 – 2.0 – 7.0 cm (50.0-310.0 g). The length of the root crop should be at least 10.0 cm.

The low-temperature spring growing season had a negative impact on the growth and development of plants. In addition, some domestic varieties were prone to strelkovanie due to prolonged low temperatures and insufficient day length during the growing season.



Conclusion

Analyzing the results obtained, it should be noted that the yield of carrots of spring sowing is most less than that of summer and late autumn ("tucsonbosti") sowing. VNIISSOK varieties turned out to be more resistant to color. However, the grown carrots of spring sowing can be used for consumer purposes according to their biometric indicators.

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