

UDC 635.64.044:[631.527.5:631.589]:631.544.4"324"

Karachun V.L., graduate student*
State Biotechnological University
e-mail: agronom@greenagro.info

THE INFLUENCE OF DIFFERENT SUBSTRATES ON THE QUALITY INDICATORS OF FRUITS OF THE BIORANGE F₁ HYBRID TOMATO WHEN GROWN IN WINTER GREENHOUSES

Introduction. In Ukraine, the assortment of tomatoes has expanded significantly in recent years and continues to grow every year. Most of the encountered tomato hybrids come from foreign breeding, but their cultivation in local conditions does not always bring the expected results [2]. In the winter greenhouses of Ukraine, tomato hybrids are classified into several main groups by fruit weight and size. The smallest tomatoes (cherries) have fruits weighing up to 30 g; cocktail tomatoes are slightly larger, weighing 30-50 g; small-fruited tomatoes weigh 50-100 g; medium-fruited tomatoes, which are the most common in greenhouses, weighing 100-180 g; large-fruited hybrids have a fruit weight of 180-250 g; beef tomatoes are characterized by the largest fruit weight of more than 250 g [4].

By 2024, the vegetable market of Ukraine is oversaturated with red medium-fruited tomatoes. Important importance is played by the import of tomatoes from neighboring countries, so Ukrainian producers are increasingly shifting production to the cultivation of an expanded assortment, which includes several groups of tomatoes. For example, PraT "Teplychniy Plant" grows the following assortment of tomatoes: red medium-fruited, pink large-fruited, yellow large-fruited [3].

For the cultivation of yellow large-fruited tomatoes, such an element of cultivation technology as the substrate is very important [6]. Analysis of literary sources indicates that coconut substrate should be used in winter greenhouses for growing large-fruited tomatoes. An organic substrate can improve the quality indicators of fruits, namely: increase the number and mass of marketable fruits, improve marketability (reduction of the number of cracked fruits and fruits affected by top rot) [5]. When grown on such substrates, the taste qualities of fruits improve [1].

Research conducted in the period 2021-2024 was intended to determine the influence of various substrates on the quality indicators of the fruits of the Biorange F₁ hybrid.

Research materials and methods. Research was conducted on the basis of Dniprovskiy TC LLC. In the winter greenhouses, which were automated, with computer microclimate regulation and the use of drip irrigation. The research was carried out with the Biorange F₁ hybrid. Control mineral wool "Hrodan". The coconut substrate "Ceres", "Forteko", "Horty" was studied. The placement scheme of the experiment options is systematically regular in four repetitions. The area of the

*Scientific adviser – Lebedynskiy I. V., candidate agricultural sciences, associated professor

accounting plot is 10 m², the total area of the plot is 14 m², the total area of the experiment is 224 m². Seedlings were grown according to the classical scheme in 35 days and planted in a permanent place in the phase of 9–11 true leaves. Scheme of placing plants, four plants per substrate (100 x 20 x 7.5 cm), the volume of the substrate under one plant is 3.75. The density of plants is 2.5 per m², with a further increase in density to 3.1 stems per m². The number of plants in the accounting area is 25 pcs. Plant care was carried out according to the technology of growing tomatoes in a greenhouse. An integrated protection system was used to protect plants from pests and diseases.

Research results. During the research period on the Biorange F₁ hybrid when grown on different substrates, the plants formed from 23.2 to 25.5 flowering tassels. Control, plants grown on mineral wool "Hrodan" formed 24.7 flowering tassels. Biorange F₁ grown on the coconut substrate "Ceres" and "Forteko" plants formed 25.3-25.5 flowering tassels, which is 0.6-0.8 pcs. more for control. Instead, Biorange F₁ grown on the coconut substrate "Horti" formed 23.2 flowering tassels on the plant, which is 1.5 pcs. less control. The number of tassels that bore fruit on the research variants was at the level of 21.8 to 24.3 pcs. from a plant. During the fruiting period, 23.4 bunches with fruits were collected from the control. From the Biorange F₁ plants grown on the coconut substrate "Ceres" and "Forteko", on average, over the years of research, 24.3 tassels were collected, which is 0.9 tassels more than the control. On the "Horti" coconut substrate, this indicator was the lowest and amounted to 21.8 tassels per plant.

During the fruiting period, an average of four years, from 77.4 to 90.8 fruits were collected from Biorange F₁ hybrid plants. In the control, 85.6 fruits per plant were collected. The lowest indicator was 77.4 pcs. on the coconut substrate "Horti", which is 8.2 fewer fruits than in the control. The largest number of fruits was collected from plants grown on the coconut substrate "Ceres" and "Forteko" at the level of 90.8 fruits, which is 5.2 pcs. more than in control. The average number of fruits in a bunch on the research variants was 3.5-3.7 fruits. The smallest number of fruits in a bunch was recorded in plants grown on the coconut substrate "Horti" - 3.5 fruits.

The analysis of the average weight of the fruits shows that the largest mass of marketable fruits in the experimental variants was at the beginning of fruiting in the third decade of March, it was from 199.8 g to 220.5 g. The smallest mass of marketable tomato fruits was 157.8 g - 165.2 g. was recorded in November at the end of fruiting. The mass of marketable fruits decreased significantly in all variants during the fruiting period of August and September. This indicator was from 152.2 to 170.0 g, which is due to the high temperature in the greenhouse. During the fruiting period, plants of the Biorange F₁ hybrid on "Hrodan" mineral wool formed fruits of a standard size, based on the recommendations of the seed manufacturer, for this hybrid. Plants grown on the coconut substrate "Ceres" and "Forteko" had a significantly higher average weight of fruits during the entire period of fruiting for each month compared to mineral wool. Over the entire fruiting period, tomato plants grown on the coconut substrate "Horti" had the lowest average fruit weight compared to the control (Table 1).

Table 1. Dynamics of the average fruit weight of the Biorange F₁ hybrid grown on different substrates, 2021-2024.

Month	Substrate			
	Mineral wool "Hrodan"	Coconut substrate "Ceres"	Coconut substrate "Horti"	Coconut substrate "Forteko"
March	207,5	220,5	199,8	222,7
April	202,0	217,0	192,3	219,2
May	198,2	209,0	183,3	211,1
June	189,9	192,3	181,4	194,3
July	184,3	188,8	172,9	190,7
August	163,5	168,3	152,2	170,0
September	165,8	166,5	161,3	168,1
October	170,8	172,2	161,4	173,9
November	161,4	163,6	157,8	165,2
Average	182,6	188,7	173,6	190,6

Biometric studies of the fruits of the Biorange F₁ hybrid for the entire fruiting period show that the average weight of the fruits was from 173.6 g to 190.6 g. The average weight of the fruit when grown on mineral wool "Hrodan" (control) was 182.6 g. The highest weight fruits were noted when growing on the coconut substrate "Forteko" 190.6 g, which is 8.0 g more than the control. The lowest weight of fruits was in plants grown on the coconut substrate "Horti" at the level of 173.6 g, which is 9.0 g less than the control. Plants grown on the coconut substrate "Ceres" formed an average fruit weight of 188.7 g, which is 6.1 g more than the control (Table 1).

Conclusions.

Growing tomato plants of the Biorange F₁ hybrid on the coconut substrate "Ceres" and "Forteko" provided an increase in the number of flowering tassels by 2.4-3.2%; tassels, which bore fruit by 3.8%; fruits from the plant at the level of 10.6%. The average fruit weight increased by 3.3-4.4%.

When grown on the coconut substrate "Horti", the Biorange F₁ tomato plants had significantly lower indicators compared to the mineral wool "Hrodan"(control). Thus, it can be concluded that the coconut substrates "Ceres" and "Forteko" have a positive effect on the quality indicators of the fruits of the tomato hybrid Biorange F₁.

References:

1. Karachun, V. L. (2023). Efektyvnist vyroshchuvannya pomidora hibrydu Bioranz na riznykh substratakh v zymovykh teplotytsyakh [The efficiency of growing the Biorange hybrid tomato on different substrates in winter greenhouses]. *Innovatsiyni rozrobky molodi v suchasnomu ovochevnytstvi: materialy VI mizhnarodnoi naukovo-praktychnoi konferentsii (5 zhovtnya 2023 r., sel. Seleksiine Kharkivskoi obl.)* / Instytut ovochevnytstva i bashtannytstva NAAN. Vinnytsia: TOV «TVORY». Pp. 27-33. [in Ukrainian].
2. Kotyk, P. S. (2017). Efektyvnist vyroshchuvannya ovochovoi produktsii u zakrytomu grunti [The efficiency of growing vegetable products in closed soil]. *Zb. nauk. prats Umanskoho derzhavnoho ahrarnogo universytetu*. Pp. 215–221. [in Ukrainian].

3. Chayka, V. O. (2015). Stratehiya rozvytku ovochivnytstva zakhyschenoho gruntu v umovakh asotsiatsii z YES. *Ekonomika ta upravlinnya*. Kyiv: KNEU. no 27/1, pp. 72-76. [in Ukrainian].
4. Karachun, V. (2024). Analysis of the influence of different substrates on growing of the Biorange tomato hybrid in winter glass greenhouses. *Information progress and technology transforming the world: monograph*. Praha: OKTAN PRINT. Pp. 329-342. [in English].
5. Tsydendambaev, A. D., Nesterov, S. Yu., Semenov, S. N. (2014). Light culture of tomato. OOO Raik Tsvan. [in English].
6. Zamparo, L., Mattiussi, A., Valent, E. & Cattivello, C. (2021). Substrate formulation to improve vegetable seedling quality and environmental sustainability. *Acta Horti*, 1305, 63–70. [in English].

UDC 631.52:581.9.063(479.22)

Samadashvili T. S., Doctor of Agricultural Sciences, Professor
Chkhutiashvili G. A., Doctor of Agricultural Sciences
Scientific-Research Center of Agriculture
e-mail: t.samadashvili@agruni.edu.ge

GENETIC AND BREEDING SIGNIFICANCE OF ENDEMIC SPECIES OF GEORGIA

Key words: wheat, species, genetics, breeding.

Due to its diverse natural, climatic and soil conditions, Georgia is the birthplace of many agricultural crops, including wheat, and is distinguished by the ancient original agriculture. Since the ancient times, wheat has been the most important agricultural crop in the world. It was domesticated about 10,000 years ago and began to spread around the world as one of the most important food crops. Archaeological evidence in Georgia confirms that Georgians began growing wheat 5,000 years ago. Early traces of farming in Georgia date back to the Mesolithic period. For millenia, Georgian people have created a variety of wheat species, which is unique in the world, and moreover, it has been confirmed that Georgia is one of the primary centers of origin of cultivated wheat (N. Vavilov, P. Zhukovsky, L. Dekaprevich, V. Menabde, M. Yakubtsiner, V. Dorofeev). This is confirmed by the fact that, 14 wheat species included in the botanical genus of cultivated wheat, were discovered and described on the territory of present-day Georgia, which makes up 70% of cultivated species. It is important that the five endemic species of Georgia *T. timopheevii* Zhuk, *T. Karamyshevii* Nevski, *T. persicum* Vav., *T. zhukovskyi* Men. & Eriz, *T. macha* Dekapr. & Men. are included in the genus wheat.

Endemic wheat species of Georgia turned out to be interesting both from the theoretical and practical-breeding point of view. Thanks to these properties, they are the best genetic source for producing intensive varieties and solving the problem of hybrid wheat.

Genetic and breeding significance of endemic wheat species in Georgia. The