RESEARCH ON THE GROWTH AND DEVELOPMENT OF SOME CHERY TOMATOES VARIETIES GROWN ON MINERAL WOOL

Andrada Iulia IENCIU[1], Mihai CARBUNAR[1], Iuliana Teodora VIDICAN[1], Mihaela Lavinia CĂRBUNAR[2], Ioan Vlad BENŢAN[1]

[1] University of Oradea, Faculty of Environmental Protection, Oradea City, Magheru 26, 410087, Romania Institution
[2] University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Mănăstur Street 3-5, 400372 Cluj-Napoca, Romania

RESEARCH ARTICLE

Abstract
The multiple cultivation possibilities and different destinations for tomato production offer a large assortment of varieties and hybrids.
Tall or semi-tall tomato varieties will be established on support systems or trellises.
When choosing the varieties for this study, the place where the production is made, the vegetation periods and the type of growth were taken into account.
In indeterminate varieties, the shoots that form at the base of the leaves are removed by pinching to ensure the growth of fruits on the main stem.

Keywords: tomatoes; varieties; growth; mineral wool;
#Corresponding author: ienciu_andrada@yahoo.com

INTRODUCTION

Tomatoes began to be cultivated in Europe for the first time in Spain, Portugal and Italy, and in the 18th-19th centuries they spread to other states.
In Romania, the favorable areas for tomato cultivation are those in the south and west of the country, but summer-autumn crops as well as protected ones are also practiced in the hill areas of Transylvania and Moldova. (Apahidean, 2020).
Originating from Central and South America, tomatoes have high requirements for temperature and light intensity, and moderate demands regarding the humidity of the culture substrate.
Atmospheric humidity in the culture spaces is kept between 70-80% in the vegetative phase, and 60-70% in the flowering phase to favor the dispersion of pollen.
Tomato fruits mature between 45-70 days depending on the variety, growing conditions and culture substrate.
During the ripening period, the fruits change color from light green to light white, pink, and finally to intense red-orange.

MATERIAL AND METHOD

Research on the growth and development of cherry tomato varieties in a substrate consisting of mineral wool and vermiculite was carried out in a vegetable microfarm in Bihor County, Tileagd locality in 2024.
The experiment is monofactorial with 4 variants, having as biological material 4 tomato varieties, namely: Tudor F1 (V1), Paskualeto F1 (V2); Cherye F1 (V3); Landolino F1 (V4).
The seedlings for the study were produced from professional seeds sown in 2.7x2.0cm cylindrical plugs of mineral wool and vermiculite, placed in pallets with alveoli and replicated in cubes measuring 10x10x2.7cm of mineral wool.
The planting of seedlings in the greenhouse took place on 12.04.2024 in a mineral wool substrate.
After planting, the humidity in the substrate was monitored so that it did not fall below 40%RH. The plants were watered with water with calcium nitrate, potassium nitrate, potassium sulfate, magnesium sulfate, potassium monophosphate, potassium chloride and microelements (iron, manganese, zinc, boron, copper, molybdenum).

Figure 1. **Transplanted tomatoes**

During July-August, the plants were watered every 30 minutes so that their humidity did not fall below 40% during the day, reaching the point where in September they were watered 3 times a day.

The general objective of the study was to establish technological elements that would improve the quantitative and qualitative parameters for the cultivation of tomatoes in a mineral wool substrate.

RESULTS AND DISCUSSIONS

In order to achieve the objectives proposed for the experimental culture, the height and the average number of inflorescences per plant were analyzed.

Figure 2. **Tomato culture**

Regarding the first parameter analyzed, the data regarding the height of cherry tomato plants obtained for the 4 varieties are presented in Table 1.

Figure 3. **Tomato production**

Table 1

Influence of the variety on the growth of cherry tomato plants cultivated in mineral wool substrate. 30.05.2024

Cr. no.	Variety	Height of the plants		± d	Significance
		cm	%	cm	
1	**Tudor F1**	294,2	99,59	-1,23	0
2	**Paskualeto F1**	296,9	100,50	1,48	*
3	**Cherye F1**	294,5	99,69	-0,93	0
4	**Landolino F1**	296,1	100,23	0,675	*
	Average (Mt)	295,425	100,00	0,00	-

$DI_{5\%}$=0,03 $DI_{1\%}$=0,05 $DI_{0,1\%}$=0,07

The height of the plants studied differed from one variety to another. Compared to the average of the 4 cultivated varieties of 295.425cm, the height was lower in the Tudor F1 variety. The plant height had the maximum value of 296.9 in the Paskualeto variety, where the difference recorded compared to the average was 1.48 cm, being statistically significant.

Table 2

Influence of the variety on the number of inflorescences/plant 30.05.2024

Cr. no.	Variety	Inflorescence/plant		± d	Significance
		pieces	%	pieces	
1	**Tudor F1**	8,3	90,71	-0,85	0
2	**Paskualeto F1**	10	109,29	0,85	*
3	**Cherye F1**	8,5	92,90	-0,65	0
4	**Landolino F1**	9,8	107,10	0,65	*
	Average (Mt)	9,15	100,00	0,00	-

$DI_{5\%}$=0,02 $DI_{1\%}$=0,03 $DI_{0,1\%}$=0,04

The average number of inflorescences per plant one and a half months after planting was 10 pieces and was recorded for the Paskualeto F1 variety. The Tudor F1 and Cherye F1 varieties had the lowest number of inflorescences per plant, being 8.3 and 8.5 respectively, the difference from the average of the 4 varieties being significantly negative.

Table 3

Influence of the variety on the growth of cherry tomato plants grown in mineral wool substrate 20.10.2024

Cr. no.	Variety	Height of the plants		± d	Significance
		cm	%	cm	
1	**Tudor F1**	696,3	96,55	-24,9	00
2	**Paskualeto F1**	750	103,99	28,8	***
3	**Cherye F1**	716,3	99,32	-4,9	0
4	**Landolino F1**	722,2	100,14	1	*
	Average (Mt)	721,2	100,00	0,00	-

$DI_{5\%}$=0,05 $DI_{1\%}$=0,07 $DI_{0,1\%}$=0,09

The average plant height before tillering was 750 cm for the Paskualeto F1 variety, compared to the average of the 4 varieties of 721.2 cmm it was 28.8 cm higher, being statistically very significant.

The plant height was lower for Tudor F1 by -24.9 cm compared to the average of the 4 varieties, a statistically significant negative difference. A significant difference compared to the average was recorded for the Landolino F1 variety.

Table 4

Influence of the variety on the number of inflorescences/plant 20.10.2024

Cr. no.	Variety	Inflorescence/plant		± d	Significance
		pieces	%	pieces	
1	**Tudor F1 (Mt)**	20,6	94,71	-1,15	0
2	**Paskualeto F1**	23,0	105,75	1,25	*
3	**Cherye F1**	21,2	97,47	-0,55	0
4	**Landolino F1**	22,2	102,07	0,45	*
	Average (Mt)	21,75	100,00	0,00	-

$DI_{5\%}$=0,03 $DI_{1\%}$=0,05 $DI_{0,1\%}$=0,07

The average number of inflorescences per plant before flowering was 21.75, with a higher number recorded in the Paskualeto F1 variety of 23 inflorescences and 22.2 in the Landolino F1 variety, the differences from the average being significant.

CONCLUSIONS

The research conducted aimed to investigate the influence of technological factors on the growth and development of tomatoes grown in a greenhouse in a mineral wool substrate.

The highest plant height throughout the crop was recorded for the Paskualeto F1 variety, followed by the Landolino F1 variety, with statistically significant comparisons with the average of the 4 varieties.

The Tudor F1 variety had the smallest height throughout the crop compared to the average of the 4 varieties, with statistically significant negative comparisons.

The variety with the highest number of inflorescences was Paskualeto, which was above the average of the 4 varieties throughout the crop.

From the study conducted, it can be seen that the Paskualeto variety developed the best and had a higher production than the other varieties.

The number of fruits per inflorescence was approximately equal in all varieties, being over 20 pieces per inflorescence at the beginning of the crop, reducing to an average of 12-14 pieces at the end of the crop.

REFERENCES

Apahidean Al. S., Al. I. Apahideanu, 2020, Legumiculture, Publishing house Risoprint, Cluj-Napoca.

Ciofu Ruxandra et al., 2004, Legumiculture, Publishing house Ceres, Bucureşti

Dennis Dannehl, Johanna Suhl, Christian Ulrichs, Uwe Schmidt, 2015, Evaluation of substitutes for rock wool as growing substrate for hydroponic tomato production, Journal of Applied Botany and Food Quality 88, 68 - 77 (2015), DOI:10.5073/JABFQ.2015.088.010

Dută Adriana, Rodica Soare, 2006, Elements of vegetable practice, Publishing house Tipo.University Craiova

Fauzia Mahanaz Shorobi, Govind Dnyandey Vyavahare, Yeong Ju Seok, Jin Hee Park, 2023, Effect of polypropylene microplastics on seed germination and nutrient uptake of tomato and cherry tomato plants, Chemosphere Volume 329, July 2023, 138679

Grabner Melanie, Christine Weidenweber, 2017, Tomatoes from passion to practice, Publishing house Casa

Indrea D. Al. S. Apahidean, 2012, Ghidul cultivatorului de legume Ediția a IIa, Publishing house Ceres, București

Kulyash Meiramkulova, Zhanar Tanybayeva, Assel Kydyrbekova, Arysgul Turbekova, Serik Aytkhozhin, Serik Zhantasov and Aman Taukenov, The Efficiency of LED Irradiation for Cultivating High-Quality Tomato Seedlings, Sustainability 2021, 13, 9426

Metin Turan, Ertan Yildirim, Melek Ekinci and Sanem Argin, 2021, Effect of Biostimulants on Yield and Quality of Cherry Tomatoes Grown in Fertile and Stressed Soils, HortScience Volume 56, Issue 4, ISSN 2327-9834

Popescu Victor, Horgoş A., 2003, Legumiculture. Publishing house Ceres, Bucureşti

Popescu Victor, Angela Popescu, 2006, Cultivation of vegetables in the field and greenhouses, Publishing house Mast

Popescu Victor, Roxana Zavoianu, 2013, Tomato, pepper and eggplant culture, Publishing house Mast

Rusu Teodor, Experimental technique, 2020, Publishing house Risoprint Cluj-Napoca ISBN 978-973-53-2496-4.

Stan T. N., Stan N. T., 1999, Legumiculture, Vol.I., Publishing house Ion Ionescu de la Brad, Iaşi