

## EVALUATION OF SOME TOMATO CULTIVARS IN THE GREENHOUSE CONDITIONS

### EVALUAREA COMPORTĂRII ÎN PRODUCȚIE A UNOR CULTIVARE DE TOMATE ÎN CULTURĂ PROTEJATĂ

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**Abstract:** *The cultivation of tomatoes in protected areas in the town of Matca in Galați county is already a tradition and ensures, along with the cultivation of other vegetable species, the main income of the growers in the area. Testing the behavior of new tomato hybrids is an activity preceding their cultivation on a larger scale. For this purpose, in 2020, an experiment was carried out in the greenhouse, with five new tomato hybrids, where the following aspects were evaluated: the dynamics of plant height and the number of leaves per plant at 60, 90 and 120 days from planting, average fruit weight and number of fruits per plant, as well as average production per unit area, both by harvest stage and in total. The final results, expressed by the total fruit production per hectare were very good and without significant differences compared to the control (experience average), except for one hybrid, where the fruit production in the second stage of harvesting was very significantly lower compared to of the control variant.*

**Key words:** hybrids, production dynamics, protected areas, semi-determinate growth, tomatoes

**Rezumat:** *Cultura tomatelor în spații protejate în localitatea Matca din județul Galați este deja o tradiție și asigură, alături de cultivarea altor specii legumicole, principalele venituri ale cultivatorilor din zonă. Testarea comportării cultivarelor noi de tomate este o activitate premergătoare utilizării acestora pe scară mai largă. În acest scop, în anul 2020 s-a realizat o experiență în solar, cu cinci cultivare de tomate, la care s-au evaluat următoarele aspecte: dinamica înălțimii plantelor și a numărului de frunze pe plantă la 60, 90 și 120 de zile de la plantare, greutatea medie a unui fruct și numărul de fructe pe plantă, precum și producția medie pe unitatea de suprafață, atât pe etape de recoltare, cât și în total. Rezultatele finale, respectiv producția totală de fructe pe hectar au fost foarte bune și fără diferențe semnificative față de martor (media experienței), cu excepția unui hibrid, la care producția de fructe în etapa a doua de recoltare a fost foarte semnificativ mai redusă față de varianta martor.*

**Cuvinte cheie** creștere semideterminată, dinamică producție, hibridi, spații protejate, tomate

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## INTRODUCTION

By cultivating tomato hybrids, the heterosis effect is excellently exploited both in terms of production (Kumar, 2006, Singh *et al.*, 2005, Tiwari and Lal, 2004) and that related to the increase in production quality (Savita and Singh, 2015). Although the domestic assortment of tomatoes for fresh consumption includes more than 60 varieties and hybrids (<https://istis.ro/>), producers often turn to cultivars marketed by foreign companies with a reputation in the field. The main characteristics sought in these modern hybrid cultivars refer not only to the high productive potential, but also to the nutritional value of the fruits (Borguini and Torres, 2009, Marti *et al.*, 2016), the uniformity of the fruits, the uniformity of the ripening period (Bramley, 2002), semi-determinate growth type or resistance to the most dangerous phytopathogenic agents. Also, out of the desire to enter the traditional market with tomatoes that look or taste "from the past", in addition to these modern hybrids, large-scale growers or amateurs also turn to local populations or traditional varieties, Romania having in their collections over 400 tomato cultivars (Străjeru, 2018).

## MATERIAL AND METHOD

The biological material was represented by three tomato hybrids with semi-determinate growth, intended for extra-early production in protected spaces (Melanet F1, Gravitet F1 and Pekonet F1), an extra-early hybrid with indeterminate growth (Alamina F1) and a semi-early Bulgarian variety, vigorous, with indeterminate growth and very large fruits (Momini Salzi). The sowing was carried out in the greenhouse, in trays with cells (fig. 1) on January 8, the transplanting was carried out in plastic pots on February 1 (fig. 2), and the definitive planting was carried out on March 15 (fig. 3), when the seedlings were about 15 cm high, 7-8 leaves and the first flower from the first open inflorescence. Planting distances were 70 cm between rows and 35 cm between plants, the cultivation technology being the standard one. The first harvest was obtained starting on May 18 (fig. 4).

The experiment was carried out inside a greenhouse, being organized according to the method of randomized blocks, in three repetitions, each repetition plot comprising five plants. During the vegetation period, biometric determinations were made to evaluate the dynamics of plant height, the number of leaves per plant, and at maturity the average weight of a fruit and the number of fruits per plant. Also, the fruit production for the two harvest cycles (the months of May and June) and the total production per unit area were determined. The obtained data were processed statistically by the analysis of variance (ANOVA) and the differences between the variants and the mean of experiment were interpreted by the method of limit differences (LD).

## RESULTS AND DISCUSSIONS

The average height of the plants in the five cultivars studied (tab. 1), 60 and 90 days after planting, did not show significant differences compared to the experience average. On the other hand, at the interval of 120 days after planting, the Melanet hybrid is highlighted by very significant negative differences compared to the average of the five cultivars. For the other four cultivars and 120 days after

planting, positive differences resulted, but only for the Pekonet hybrid, the difference was positive and distinctly significant.



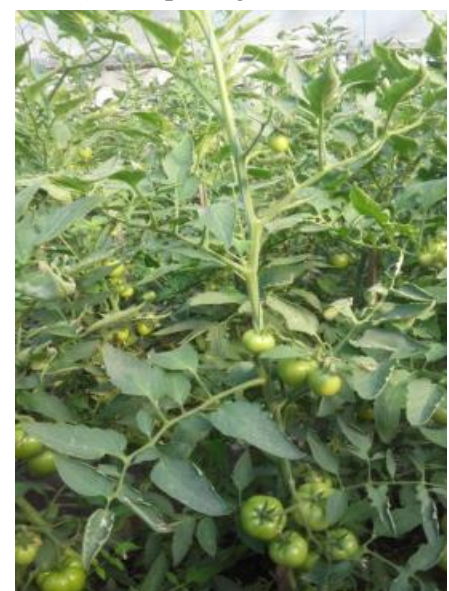
**Fig. 1.** Emergence of seedlings



**Fig.2.** Repotting



**Fig. 3.** Planted definitively



**Fig. 4.** Fruiting

The number of leaves per plant (tab. 2) showed insignificant negative differences in Melanet and Alamina hybrids at all three time intervals. Only the

Pekonet hybrid stands out with a number of leaves significantly higher than the average of the experience, for the intervals of 90 and 120 days after planting.

Table 1

**The influence of the cultivar on the plant height dynamics (cm)**

Cultivar	At 60 days		At 90 days		At 120 days	
	H	± d	H	± d	H	± d
	(cm)	(cm)	(cm)	(cm)	(cm)	(cm)
Melanet	49.7	-1.60	74.3	-2.00	137.7	-16.53 <sup>ooo</sup>
Gravitet	50.7	-0.60	75.7	-0.67	154.7	0.47
Momini Salzi	51.0	-0.27	77.0	0.67	156.7	2.47
Pekonet	53.3	2.07	78.3	2.00	164.3	10.13 <sup>**</sup>
Alamina RZ	51.7	0.40	76.3	0.00	157.7	3.47
$\bar{X}$ (St.)	51.3	-	76.3	-	154.2	-
LD 5%		4.81		3.56		6.93
LD 1%		7.00		5.18		10.09
LD 0,1%		10.51		7.77		15.13

Table 2

**The influence of the cultivar on the dynamics of the number of leaves per plant**

Cultivar	At 60 days		At 90 days		At 120 days	
	Nr.	± d	Nr.	± d	Nr.	± d
Melanet	9.7	-3.27	13.7	-1.27	17.7	-2.67 <sup>o</sup>
Gravitet	14.3	1.40	15.7	0.73	20.3	0.00
Momini Salzi	13.0	0.07	14.7	-0.27	21.3	1.00
Pekonet	15.0	2.07	16.7	1.73 <sup>**</sup>	22.7	2.33 <sup>*</sup>
Alamina RZ	12.7	-0.27	14.0	-0.93	19.7	-0.67
$\bar{X}$ (St.)	12.9	-	14.9	-	20.3	
LD 5%		3.62		1.42		2.19
LD 1%		5.27		2.07		3.19
LD 0.1%		7.90		3.10		4.78

The average weight of a fruit (tab. 3) is very significantly higher in the Momini Salzi variety, and precisely because of the very large size, typical of this variety, for the four hybrids, the resulting differences are all negative, either insignificant or significant (in the hybrid Melanet). The number of fruits per plant (tab. 3) in the five cultivars studied did not differ significantly from the average of the experience.

From the analysis of the dynamics of fruit production (tab. 4) at the first harvest (cycle I, from May), it was observed that for two cultivars, Gravitet and Momini Salzi, there were insignificant negative differences, the lowest production, of 29.4 to/ha, being obtained with the Gravitet hybrid. Values superior to the control, but insignificant, resulted in the Pekonet, Alamina and Pekonet hybrids, the latter proving to be the most productive in this first harvest stage.

In the second harvest stage (cycle II, from June), the fruit production of the Gravitet hybrid was distinctly significantly lower than the experience average, and the Alamina hybrid registered a negative but insignificant difference.

Table 3

**The cultivar influence on fruit weight and fruit number per plant**

Cultivar	Average weight of a fruit		Number of fruits per plant	
	g	± d	Nr.	± d
Melanet	142.0	-82.93°	17.0	-2.07
Gravitet	199.7	-25.27	20.0	0.93
Momini Salzi	424.0	199.07***	20.0	0.93
Pekonet	164.7	-60.27	21.0	1.93
Alamina RZ	194.3	-30.60	17.3	-1.73
$\bar{X}$ (St)	224.9	-	19.1	
LD 5%		75.74		3.30
LD 1%		110.16		4.80
LD 0.1%		165.24		7.21

Table 4

**Influence of the cultivar on the dynamics of tomato production (to/ha)**

Cultivar	Cycle I (May)		Cycle II (June)		Total production (I + II)	
	to/ha	± d	to/ha	± d	to/ha	± d
Melanet	31.8	0.90	17.8	0.85	49.6	1.75
Gravitet	29.4	-1.50	14.9	-2.08 <sup>oo</sup>	44.3	-3.58 <sup>oo</sup>
Momini Salzi	30.7	-0.13	17.7	0.75	48.5	0.62
Pekonet	31.3	0.47	17.9	0.89	49.2	1.35
Alamina RZ	31.1	0.27	16.6	-0.41	47.7	-0.15
$\bar{X}$ (St)	30.9		17.0		47.8	
LD 5%		1.82		1.11		2.04
LD 1%		2.65		1.62		2.97
LD 0.1%		3.97		2.43		4.45

In the case of the Melanet and Pekonet hybrids, as well as the Momini Salzi variety, the productions obtained in the II harvest cycle did not significantly exceed the control variant.

For the two harvest cycles combined, it turned out that in the case of the Gravitet hybrid, the distinctly significant difference, of 3.58 t/ha, keeps it in last place in the productivity top of the five analyzed cultivars. And for the Alamina hybrid, the difference was negative, but without statistical significance. For the other three cultivars, insignificant production increases resulted, the highest value being recorded in the case of the Melanet hybrid.

## CONCLUSIONS

Although the Alamina hybrid and the Momini Salzi variety are described in the seed merchants' catalogs as having great vigor, according to the results of this experiment, it turned out that the most vigorous growth was recorded by the Pekonet hybrid.

Melanet, Gravitet and Pekonet hybrids are extra-early hybrids with semi-determinate growth, balanced vigor, uniform fruit and good taste.

All five cultivars tested were characterized by very good productions, the differences compared to the experience average being negative, with statistical significance, only for the Gravitet hybrid.

The significant negative difference in the case of the Gravitet hybrid was the result of a more intense pest attack during the growing season.

The general behavior of the plants and the productions obtained demonstrated that both the culture conditions and the value of the tested cultivars were at the desired level.

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