

INFLUENCE OF CULTIVAR AND IRRIGATION REGIME ON TOMATO YIELD

INFLUENȚA CULTIVARULUI ȘI A REGIMULUI DE UDARE ASUPRA CANTITĂȚII DE RECOLTĂ LA TOMATE

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Abstract. Sustainable assessment of tomato yield can be carried out through the technological measures used. Early production allows farmers to better respond to early market demands. The aim of the work was to evaluate the influence of four tomato cultivars irrigated with two different irrigation norms on early and total production. The highest early yield was recorded in the hybrid Siriana F₁ (41.35 t/ha), while the highest total yield was obtained by the cultivar HTP F₁ (143.27 t/ha). As for the combined interaction of factors on early yield, it ranged from 22.11 t/ha in the case of the variety Inima de bou, irrigated with 300 m³/ha, to 42.19 t/ha in the case of the hybrid Siriana, irrigated with 400 m³/ha.

Key words: tomato, cultivars, water quantity, yield

Rezumat. Evaluarea sustenabilă a producției de tomate se poate realiza prin prisma măsurilor tehnologice utilizate. Producția timpurie permite agricultorilor să răspundă mai bine cererilor timpurii de pe piață. Scopul lucrării a fost de a evalua influența a patru cultivare de tomate irigate cu două norme diferite de udare asupra producției timpurii și totale. Producția timpurie cea mai ridicată a fost înregistrată la hibridul Siriana F₁ (41,35 t/ha), în timp ce producția totală cea mai mare a fost obținută de cultivarul HTP F₁ (143,27 t/ha). În ce privește interacțiunea combinată a factorilor asupra producției timpurii, aceasta a variat de la 22,11 t/ha, în cazul soiului Inimă de bou, irigat cu norma de 300 m³/ha, până la 42,19 t/ha, în cazul hibridului Siriana F₁, irigat cu norma de 400 m³/ha.

Cuvinte cheie: tomate, cultivare, cantitate de apă, producție

INTRODUCTION

Tomato originate from the wild species *Lycopersicon esculentum* var. *cerasiforme*, which originates in the highlands of the Andes Mountains - in Peru. About 5000 years ago, the species reached the high plateau area of Mexico, where the second center of diversity was established (Inculet *et al.*, 2017; Draghici *et al.*, 2013).

Around 200 BC, the species *L. esculentum* was taken into the farming by the indigenous civilizations of Mexico. (Medelete *et al.*, 2017; Corduneanu *et al.*, 2015).

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Tomato were introduced to Europe by the Spanish soon after the discovery of America, first spreading to Spain, Portugal and Italy, and in the late 15th century to Britain. They later expanded to the Netherlands, Germany and Austria (Stoleru *et al.*, 2014).

In Romanian countries, tomato have been known since the late 19th and early 20th centuries, after Bulgarian and Serbian gardeners introduced the method of seedling production on biofuel-heated beds (Catana *et al.*, 2017).

Tomato provide very high yields, except during peak harvest periods, and are quite perishable. Tomato cultivation allows intensive and rational land use and the practice of modern technologies (Dobrescu *et al.*, 2016).

The work aimed to assess the influence of cultivar and irrigation regimes on early and total tomato yield.

MATERIALS AND METHOD

The experiment was carried out in 2022 in the experimental horticultural field of the farm „V. Adamachi,” which is part of the Didactic Station Iasi. Three tomato hybrids (Siriana F1, Minaret F1, HTP F1) and a local variety (Inima de bou) were used as biological material.

The factors studied for the conduct of the experiment were the cultivar with four graduations: Siriana F1, Minaret F1, HTP F1 and Inima de bou, respectively, the irrigation norm of the crop with two graduations: irrigation with 300 m³/ha and irrigation with 400 m³/ha.

The crop establishment was done by sprouting seedlings in pots with a diameter of 9 cm; sowing was done in mid-February, sprouting in early March and planting in the plot at the beginning of the third decade of April. The seedlings were planted in a 400 m² plot. For the assessment of early production, the average harvests up to 30 July were added together. The results were statistically interpreted with SPSS version 21 software using ANOVA analysis for 95% confidence, and the significance of the difference was performed using Tukey test.

RESULTS AND DISCUSSIONS

Table 1 shows the influence of cultivars on early and total tomato production. Values are presented as mean \pm standard deviation. The experiment shows significant differences in early tomato yield according on the cultivar used. The cultivar Siriana F1 has a higher average early yield (41.35 t/ha) than the other cultivars. Regarding cultivar influence on total yield, it ranged from 114.16 t/ha for the cultivar Inima de bou to 143.27 t/ha for the hybrid HTP F1.

The influence of the irrigation rate on early and total tomato production show into table 2. We observe statistically significant differences in early and total tomato yield depending on the irrigation norm. Irrigation with 400 m³/ha shows a slightly higher average early production (33.59 t/ha) than irrigation with 300 m³/ha (31.99 t/ha).

Table 1

Results on the influence of cultivar on early and total tomato production (2022)

Crt. No.	Cultivar	Early production (t/ha)	Total production (t/ha)
1.	Siriana F1	41.35±11.10d	135.35±10.86c
2.	Minaret F1	34.89±9.82c	124.89±9.42b
3.	HTP F1	31.77±11.49b	143.27±11.34d
4.	Inima de bou	23.16±7.92a	114.16±8.91a

*Values represent mean ± standard error. Lowercase letters represent Tukey test results for $p \leq 0.05$ (a - represents the lowest value).

Table 2

Results on the influence of irrigation regime on early and total tomato production (2022)

Crt. No.	Interaction	Early production (t/ha)	Total production (t/ha)
1.	WQ ₁	31.99±11.35	118.74±9.37
2.	WQ ₂	33.59±9.21	140.09±10.82
	Significance	*	*

Values represent mean ± standard error. Lowercase letters represent Tukey test results for $p \leq 0.05$ (- significant differences; WQ1 - irrigation with 300 m³/ha; WQ2 - irrigation with 400 m³/ha).

Regarding early tomato production, the hybrid Siriana irrigated at 400 m³/ha has the highest value (42.19 t/ha), followed by the cultivar Siriana irrigated at 300 m³/ha (tab. 3). These are followed by Minaret cultivar watered with 400 m³/ha irrigation norm (36.82 t/ha), HTP under 400 m³/ha (31.16 t/ha) and Minaret, irrigated with 300 m³/ha (32.95 t/ha).

Table 3

Results of the influence of factors on early and total tomato yield (2022)

Crt. No.	Interaction	Early production (t/ha)	Total production (t/ha)
1.	S x WQ ₁	40.51±9.13abcdef	117.51±9.13abcdef
2.	S x WQ ₂	42.19±11.9f	153.19±11.9f
3.	M x WQ ₁	32.95±9.01abcdef	115.95±9.01abcdef
4.	M x WQ ₂	36.82±10.39abcdef	133.82±10.39abcdef
5.	H x WQ ₁	32.37±10.98abcdef	141.37±10.98abcdef
6.	H x WQ ₂	31.16±11.28abcdef	145.16±11.28abcdef
7.	IB x WQ ₁	22.11±7.78a	100.11±7.78a
8.	IB x WQ ₂	24.20±9.96abc	128.20±9.96abcdef

*Values represent mean ± standard error. Lowercase letters represent Tukey test results for $p \leq 0.05$ (a - represents the lowest value and ns - not significant; S - Siriana F1; M - Minaret F1; H - HTP F1; IB - Inima de bou; WQ1 - irrigation with 300 m³/ha; WQ2 - irrigation with 400 m³/ha).

Concerning the total tomato yield, the hybrid Siriana irrigated with 400 m³/ha norm recorded the highest value (153.19 t/ha), followed by the interaction HTP under 400 m³/ha norm (145.16 t/ha) and Minaret irrigated with 400 m³/ha norm (133.82 t/ha).

CONCLUSIONS

The choice of the suitable cultivar can significantly influence the quantity of both early and total tomatoes produced. The good results in the case of early production were obtained by the cultivar Siriana (41.35 t/ha) and the hybrid HTP in the case of total production (143.27 t/ha).

Both irrigation norms had a statistically significant influence on both early and total yield.

The early yield influenced by cultivar and irrigation regime varied widely from 22.11 t/ha in the case of the variety Inima de bou irrigated at 300 m³/ha to 42.19 t/ha in the case of the hybrid Siriana F1 irrigated at 400 m³/ha.

The highest value of total yield was provided by the hybrid Siriana watered with 400 m³/ha.

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