

THE ECONOMIC EFFICIENCY OF A SUMMER-AUTUMN TOMATO CROP IN THE VIDRA AREA, ILFOV COUNTY, IN 2016

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Abstract

The experiment, which aimed at controlling the pathogens that attack the summer-autumn tomato crops, included 5 variants. There were applied 5 treatments correlated with climatic factors. During the vegetation period we observed the appearance of the pathogens *Xanthomonas vesicatoria*, *Alternaria solani*, *Phytophthora infestans*, *Colletotrichum coccodes* and *Phytophthora parasitica*. The evaluation of efficacy of the variants was made in correlation with degree of attack (on the foliage) and frequency of attack (on the fruit) of the pathogens, and the economic efficiency was established according to the obtained yield. Experimental variants I (treatments: 1. Dithane M 45 0.2% + Champ 77 WG 0.3%; 2. Dithane M 45 0.2% + Cabrio Top 0.2%; 3. Melody Compact 49 WG 0.2%; 4. Melody Compact 49 WG 0.2%; 5. Melody Compact 49 WG 0.2% + Cabrio Top 0.2%) and III (treatments: 1. Polyram DF 0.2% + Champ 77 WG 0.3%; 2. Polyram DF 0.2% + Cabrio Top 0.2%; 3. Ridomil Gold Plus 42.5 WP 0.3%; 4. Ridomil Gold Plus 42.5 WP 0.3%; 5. Ridomil Gold Plus 42.5 WP 0.3% + Cabrio Top 0.2%) gave the highest profit (I-13,129.46 lei and III-12,734.78 lei/1000sq.m.).

Key words: economic efficiency, tomato pathogens, yield.

1. INTRODUCTION

Economic efficiency is a component of human rationality that expresses the relationship between the useful effect (the result obtained) and the effort (expense) made to obtain it (Crețoiu et. al., 2003). Economic efficiency is shaped by comparing the effects of an action with the efforts required to produce it (www.referatele.com/referate/economie). Profit is a surplus of income from the sale of goods over their cost (Crețoiu et. al., 2003). Profit is a material income that can be the income of the capital used in an enterprise, representing the difference between the receipts and the total expenses (<https://ro.wikipedia.org/wiki/Profit>).

2. MATERIALS AND METHODS

The experience, which aimed at controlling pathogens attacking summer-autumn tomato crops, was established on 06.06.2016 in the experimental field at RDIVFG - Vidra, using the growing tomato variety, Pontica. The Pontica field tomatoes variety is semi-late, designed for summer-autumn culture, with firm, spherical-fleshy, intense red fruit (www.semințe1.eu/cumpără/pontica).

The experience consisted of 5 variants, in 4 replicates, placed in randomized blocks, the rectangular plot area being 10 m². There were 5 treatments, at variants 1-4, at intervals of 10-15 days, in correlation with the climatic factors.

During the vegetation period observations were made on the frequency and intensity of attack of pathogens present in culture (*Xanthomonas vesicatoria*, *Alternaria solani*, *Phytophthora infestans*, *Colletotrichum coccodes*, *Phytophthora parasitica*).

The evaluation of the effectiveness of the treatment variants was based on the degree of attack (on the foliage) and the frequency of the attack (on the fruit) of the pathogens, and the economic efficiency was determined according to the production obtained.

Table 1 describes the fungicidal products used, the active substance and their pause time for tomato culture.

Table 1. Description of fungicidal products used in tomato field cultivation (Vidra, 2016)

Nr. crt.	Fungicide product	Active substance	Break time
1.	Dithane M 45 0.2%	80% mancozeb	3 days
2.	Champ 77 WG 0.3%	50% copper metal + copper hydroxide	7 days
3.	Bravo 500 SC 0.2%	chlorotalonil 500 g / l	3 days
4.	Polyram DF 0.2%	80% metiram	5 days
5.	Cabrio Top 0.2%	55% metiram, 5% piraclostrobin	7 days
6.	Melody Compact 49 WG 0.2%	84 g / kg iprovalicarb + 406 g / kg Cu in the form of copper oxychloride	7 days
7.	Acrobat MZ 69 WG 0.2%	9% dimethomorph, 600 g / kg mancozeb	3 days
8.	Ridomil Gold Plus 42.5 WP 0.3%	2.5% mefenoxam + 40% copper	3 days

The experimental variants and sequence of treatments applied to the field tomato culture are shown in Table 2.

Table 2. The succession of tomato cultivation treatments in the field (Vidra, 2016)

Variant	July Treatment I	August Treatments I, II, III	September Treatment I
1.	I. Dithane M 45 0.2% + Champ 77 WG 0.3%	I. Dithane M 45 0.2% + Cabrio Top 0.2% II, III. Melody Compact 49 WG 0.2%	I. Melody Compact 49 WG 0.2% + Cabrio Top 0.2%
2.	I. Bravo 500 SC 0.2% + Champ 77 WG 0.3%	I. Bravo 500 SC 0.2% + Cabrio Top 0.2% II, III. Acrobat MZ 69 WG 0.2%	I. Acrobat MZ 69 WG 0.2% + Cabrio Top 0.2%
3.	I. Polyram DF 0.2% + Champ 77 WG 0.3%	I. Polyram DF 0.2% + Cabrio Top 0.2% II, III. Ridomil Gold Plus 42.5 WP 0.3%	I. Ridomil Gold Plus 42.5 WP 0.3% + Cabrio Top 0.2%
4.	I. Ployram DF 0.2%	I. Bravo 500 SC 0.2% + Cabrio Top 0.2% II, III. Bravo 500 SC 0.2%	I. Bravo 500 SC 0.2% + Cabrio Top 0.2%
5.	Variant untreated	-	-

3. RESULTS AND DISCUSSIONS

Table 3 shows the average efficacy of fungicide treatments in tomato field crops.

Table 3. Effectiveness of some variants of fungal treatment in tomato field cultivation (Vidra, 2016)

Variant	Frequency of attack (%) on fruit					Efficacy (%)	Mean Efficacy (%)
	<i>P.parasitica</i>	<i>A.solani</i>	<i>C.coccodes</i>	<i>P.infestans</i>	Total		
1.	3.9	2.1	1.1	0.8	7.9	82.3 (I)	85.1 (I)
2.	5.4	2.4	1.3	1.1	10.2	77.2 (III)	81.0 (III)
3.	5.1	2.2	1.5	1.3	10.1	77.4 (II)	81.1 (II)
4.	8.7	2.9	2.3	2.5	16.4	63.3 (IV)	72.7
5.	20.8	10.9	7.8	5.2	44.7	-	-

For both foliage and fruit protection, the median efficacy was 85.1% (variant 1, 1st place), 81.1% (variant 3, 2nd place) and 81.0% (variant 2, third place).

Table 4. Effectiveness of some variants of fungal treatment in tomato field cultivation (Vidra, 2016)

Variant	The degree of attack (%) on the leaves				Total	Efficacy (%)
	<i>Pseudomonas tomato</i>	<i>Alternaria solani</i>	<i>Fulvia fulva</i>	<i>Phytophthora infestans</i>		
1.	1.3	2.0	1.6	1.2	6.1	87.9 (I)
2.	2.4	2.2	1.5	1.5	7.6	84.9 (II)
3.	2.2	2.4	1.7	1.3	7.6	84.9 (II)
4.	2.0	1.8	1.4	3.8	9.0	82.2 (III)
5.	13.5	16.8	10.9	9.1	50.3	-

The degree of total attack (%) on the foliage of pathogens *Pseudomonas tomato*, *Alternaria solani*, *Fulvia fulva* and *Phytophthora infestans* was 6.1% (variant 1), 7.6% (variants 2 and 3) and 9.0% (variant 4), compared to 50.3% in untreated control variant. The efficacy of the treatment variants was over 80.0%: 87.9% (variant 1, place I), 84.9% (variants 2 and 3, second place) and 82.2% (variant 4, place III) (Table 4).

For the attack frequency calculation, the formula: $F\% = N \times 100 / N_t$, where N = number of attacked organs and N_t = total number of organs observed was used.

For the attack rate calculation we used the formula: $GA\% = I \times F / 100$, where I = mean attack intensity, F = attack frequency.

For the calculation of efficacy, Abott's formula was used: $E\% = (1 - a_2 / (N - M_2)) \times 100$, where E = product efficacy, a_2 = number of leaflets attacked on the treated variant, M_2 = number of leaves unattached to the control.

The highest production, 7.034 kg/m², was also recorded for variant 1 (place I), followed by variant 3 with 6.874 kg/m² (place II) and variant 2 with 6.620 kg/m² (3rd place) compared to the production obtained in the untreated control variant of only 5.264 kg/m².

The relatively high production of the untreated variant is due to the fact that the pathogen attack was late and evolved in the second and third decades of August and the first decade of September.

Table 5 shows the economic efficiency of tomato field cultivation from experience with fungicide treatment variants.

Table 5. Economic efficiency in tomato field cultivation / 1000sq.m. (Vidra, 2016)

Nr.crt.	Name	V1	V2	V3	V4	V5
1.	Material expenses	3,233.18	3,221.79	3,202.64	3,089.49	2,318.58
2.	Expenditure on manual work	4,458.00	4,332.51	4,409.62	3,942.91	3,201.00
3.	Total expenses	7,691.18	7,554.30	7,612.26	7,032.40	5,519.58
4.	Production t / 1000sq.m.	7.034	6.620	6.874	5.630	5.264
5.	Production value (lei), for 2.96 lei/kg	20,820.64	19,595.20	20,347.04	16,664.80	15,581.44
6.	Profit (lei)	13,129.46	12,040.90	12,734.78	9,632.40	10,061.86

In Figure 1, economic efficiency is plotted.

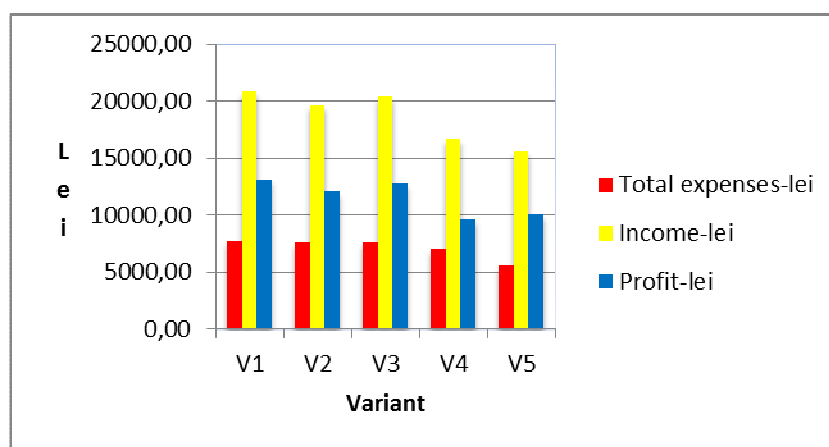


Figure 1. Economic efficiency in tomato field crop/1000sq.m. (Vidra, 2016)

Variants 1 and 3 obtained the highest profit of 13,129.46 lei and 12,734.78 lei respectively, followed by variant 2, with a profit of 12,040.90 lei.

4. CONCLUSIONS

Of the variants experimented in summer-autumn tomato cultivation in the field for the control of pathogens, variant 1 (treatments: 1. Dithane M 45 0.2% + Champ 77 WG 0.3%; 2. Dithane M 45 0.2% + Cabrio Top 0.2%; 3. Melody Compact 49 WG 0.2%; 4. Melody Compact 49 WG 0.2%; 5. Melody Compact 49 WG 0.2% + Cabrio Top 0.2%) and variant 3 (treatments: 1. Polyram DF 0.2% + Champ 77 WG 0.3%; 2. Polyram DF 0.2% + Cabrio Top 0.2%; 3. Ridomil Gold Plus 42.5 WP 0.3%; 4. Ridomil Gold Plus 42.5 WP 0.3%; 5. Ridomil Gold Plus 42.5 WP 0.3% + Cabrio Top

0.2%) were noted. The highest profit was obtained at variants 1 and 3 (I- 13,129.46 lei and III- 12,734.78 lei/1000 sq.m.). Variant 2 (treatments: 1. Bravo 500 SC 0.2% + Champ 77 WG 0.3%; 2. Bravo 500 SC 0.2% + Cabrio Top 0.2%; 3. Acrobat MZ 69 WG 0.2%; 4. Acrobat MZ 69 WG 0.2%; 5. Acrobat MZ 69 WG 0.2% + Cabrio Top 0.2%) ranks 3rd in terms of registered profits (II- 12,040.90 lei/1000 sq.m.).

5. REFERENCES

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