

THE INFLUENCE OF ORGANIC FERTILIZATION IN SEVERAL TOMATO AND PEPPER HYBRIDS GROWN IN GREENHOUSES

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Abstract

Both tomatoes and peppers are basic vegetables grown both in the field and protected areas. Both vegetables are distinguished by a high content of vitamins and mineral salts being appreciated by consumers. High yields of these species can only be obtained by additional fertilizer intake. Organic fertilizer fertilization prior to the establishment of the crop produces significant production increases. The influence of organic fertilization is different depending on species and cultivar.

Keywords: tomatoes, peppers, organic fertilization, crops in greenhouses

INTRODUCTION

As a comparison with other products used in alimentation, like bread, milk, and meat, vegetables contain smaller quantities of proteins, glucides and lipides and as a result they have a smaller energetic value, instead they have bigger quantities of vitamins and mineral salts.

Tomatoes began to be cultivated for everyday consumption around 1800. (Maier,1969).

Pepper is a species with high alimentary and economical value, taking an important place in vegetable crops from the world and from our country, following as importance after tomato, onion and cabbage. The pepper's fruit has a high alimentary value as a result of the analyzes taken by Georgeta Enachescu at the Biochemistry and Technology Laboratory from I.C.H.V. it appears that the pulp of the peppers cultivated in our country contain as a percentage of the gross weight 2,4 - 5,97% glucides, 0,7 - 1,45% protides, 6,21 - 6,84% dry substance and about 1% lipides. Pepper stands out through its large amount of vitamins, especially ascorbic acid (vitamin C) with values of 100 - 200mg at 100g, not being ingested by any other fruit, being 4-5 times richer in vitamin C than lemons or oranges.

Directing the tomato nutrition regime is made based on the specific consumption of tomatoes, depending on the cultivar, the phenophase, the crop system and other vegetation factors. At a production of 35 t / ha, for summer tomatoes in the field, one tonne of fruit consumes: 2.6 - 3.8 kg of nitrogen; 0.4-1.0 kg superphosphate; 3.6 - 4.0 kg of potassium salt; 4.0 kg of calcium oxide; 0.6 kg of magnesium oxide (Davidescu and Davidescu, 1992). Mineral and organic fertilizers contain different forms and quantities

of nitrogen, which can affect the quantity and quality of production. Thus, in a study by HEEB et al., (2005) in which they studied the required amount of N in the form of nitrate, ammonia and in organic form (taken from poultry fertilizer), they concluded that there were no significant differences in the case of plants at the application of nitrate or ammonium, higher yields being obtained when applying organic fertilizer.

The pepper reacts very well with the fertilization with organic fertilizers, applied both to the basic fattening and during the vegetation period (Bălașa, 1973). It needs a good supplying of the soil with potassium (Somos, 1967), because it influences the quality of the harvest in a good way (Ivanic and Fecenco, 1969)

MATERIAL AND METHODS

In order to establish the proposed objectives the research was carried out at the SCDP Oradea in 2017 in the solariums with in the resort. The pedoclimatic conditions in the area allow for good cultivation of tomatoes and pepper. The first monofactorial experience had 7 varieties in 3 rehearsals. Biological material was represented by 7 tomato varieties, namely: Pineapple, Black Beauty, Roses of Berne, Siriana F1 (witness of the experience), Tolin F1, Sandoline F1, Optima F1. At the second tomato experience, the same variants were used with the same varieties, but prior to planting the soil was fertilized with an organic fertilizer, Organic Plantella at a dose of 0.3 Kg / m².

The Organic Fertilizer is a 100% organic fertilizer in the form of pellets that is heat-treated and free from any impurities, weed seeds or pathogens. It contains all the main NPK nutrients in organic form.

Each variant had 10 plants the statistical processing of the experimental data was done by variance analysis.

In the case of pepper, the first experience had 5 variants in 3 rehearsals. The biological material consisted of 5 long pepper varieties, namely: Slonovo Uvo, Napoca F1 (witness of the experience), Ariadni F1, Magus F1 and Campari F1. As with tomatoes, at these experience the soil was fertilized with Organic Plantella at a dose of 0.3 kg / m². Each variant had 10 plants, and the statistical processing of the experimental data was done by variance analysis.

RESULTS AND DISCUSSIONS

It should be noted that the greenhouses were installed in autumn 2016 and the soil has not been fertilized for a long time with organic fertilizers. Table 1 shows the production of unfertilized tomatoes on each

variant. Compared to the control, it was observed that the highest production was obtained by Optima F1 (5.64 kg / m²) with a production increase of 51.6% compared to the control, the difference from it was statistically positive very significantly. Tolin F1 and Ananas with 1.12 kg / m² and 1.17 kg / m² respectively at Tolin F1 compared to the control, both the difference in the difference was statistically significantly positive. Roses of Berne and Sandoline F1 made only 86.82% of the witness's production of 84.67% for the Sandoline hybrid. Both the difference to Siriana F1 was statistically significantly negative. Table 2 shows the production of tomatoes fertilized with Organic Plantella. Compared to the same non-fertilized variants, the fertilized variants recorded significant increases in production, for example the Roze de Berne variety, which in the case of the unfertilized variant failed to obtain a production above the level of the witness, in the fertilized variant it obtained 15.6% over the control . The highest production was obtained by the hybrid Optima F1 with a production increase of 50.88% compared to the mator and 1.18 kg /m² more than the same unfertilized variant. The difference from the control was statistically significantly positive. In the case of the Tolin F1 hybrid, the production obtained in the fertilized variant was superior to the control but did not exceed the 5% threshold and was not statistically assured. The only variety that did not exceed the control variant was Sandoline F1, but the difference was not statistically assured.

Table 1

The production of unfertilizedtomatoes
SCDP Oradea 2017

Cr. no.	Variant	Absolute production of tomatoes kg/m ²	Relative production of tomatoes %	± d kg/m ²	Significance
1	Ananas	4.84	130.10	+1.12	xxx
2	BlakBeauty	4.35	116.93	+0.63	xx
3	Rose de Berne	3.23	86.82	-0.49	o
4	Tolin F1	4.89	131.45	+1.17	xxx
5	Sandoline F1	3.15	84.67	-0.57	o
6	Optima F1	5.64	151.61	+1.92	xxx
7	Siriana F1 Mt	3.72	100.00	0.00	-

LSD_{5%}=0.44

LSD_{1%}=0.62

LSD_{0,1%}=0.88

Table 2

The production of tomatoes fertilized with Plantella Organic
SCDP Oradea 2017

Cr. no.	Variante	Absolute production of tomatoes kg/m ²	Relative production of tomatoes %	± d kg/m ²	Significance
1	Ananas	6.29	139.15	+1.77	xxx
2	BlakBeauty	5.32	117.69	+0.80	xx
3	Rose de Berne	5.21	115.16	+0.69	x
4	Tolin F1	5.03	112.83	+0.51	-
5	Sandoline F1	4.03	89.15	-0.49	-
6	Optima F1	6.82	150.88	+2.30	xxx
7	Siriana F1 Mt	4.52	100.00	0.00	-

LSD_{5%}=0.54LSD_{1%}=0.74LSD_{0,1%}=1.06

The research continued with the production of unfertilized and fertilized long peppers in the 5 pepper varieties studied. Table 3 presents the production of long peppers in a non-fertilized system in the 5 varieties. Compared with the control, the Ariadni F1 hybrid obtained the highest production with 1.46 kg / m² more than the control, the difference being statistically positive. The Slonovo Uvo variety managed to exceed the witness by 13.71%. The difference was statistically significantly positive. The Campari variety made only 86.99% of the Napoca hybrid production and the difference was statistically significantly negative.

Fertilization with Plantella organic fertilizer has positively influenced the production of long peppers, which means that pepper reacts favorably to organic fertilizers. Table 4 shows the production of long peppers for each organic fertilized variety. As with the first pepper experience, Ariadnei recorded the highest production with 29.47% more than the witness. The difference was statistically positive and very significant. The Magus F1 hybrid reacted best. Compared to the unfertilized variant, it was harvested in the fertilized variant with 2.2 kg / m² of pepper and 21.13% more than Napoca F1. The difference was statistically positive distinctively significant. Even though the Campari variety progressed after fertilization, gaining 1.05 kg more than in the previous version, failed to overcome the control variant. The difference was small and was not statistically assured.

Table 3

The production of peppers unfertilized
SCDP Oradea 2017

Cr. no.	Variant	Absolute production of peppers kg/m ²	Relative production of peppers %	± d kg/m ²	Significance
1	SlonovoUvo	4.81	113.71	+0.58	x
2	Ariadni F1	5.69	134.41	+1.46	xxx
3	Magus F1	3.76	88.80	-0.47	-
4	Campari F1	3.68	86.99	-0.55	o
5	Napoca F1 Mt	4.23	100.00	0.00	-
		LSD _{5%} =0,50	LSD _{1%} =0,81	LSD _{0,1%} =1,05	

Table 4

The production of peppers fertilized with Plantella Organic
SCDP Oradea 2017

Cr. no.	Variant	Absolute production of peppers kg/m ²	Relative production of peppers %	± d kg/m ²	Significance
1	SlonovoUvo	5.82	118.29	+0.90	x
2	Ariadni F1	6.37	129.47	+1.45	xxx
3	Magus F1	5.96	121.13	+1.04	xx
4	Campari F1	4.73	96.13	-0.19	-
5	Napoca F1 Mt	4.92	100.00	0.00	-
		LSD _{5%} =0.59	LSD _{1%} =0.96	LSD _{0,1%} =1.26	

CONCLUSIONS

The researches carried out at the Oradea Environmental Protection Faculty Research Institute regarding the influence of organic fertilization on several varieties of tomatoes and peppers allowed to draw conclusions:

1. Organic fertilization plays an important role in increasing production especially on organic non-fertilized soils for a long time.
2. The Optima hybrid has a high production potential and under conditions of non-fertilization it achieves 56.64 t /ha and fertilization has produced a production increase of over 20%.
3. The Ananas variety does not give it is hybrid, it has a very good behavior, surpassing in some cases the production of hybrids, under fertilization conditions it has over 60 t / ha.
4. A hybrid that was below expectations is Sandoline F1, which even under fertlings barely exceeded 40 t/ha, probably this hybrid also needs a sustained phase fertilization.

5. The reaction of the Magus pepper variety to the organic fertilization was the most relevant, its fertilized production being 58% higher than the unfermented variant.
6. The highest production potential had the Ariadne pepper variety that surpassed the witness in both experiments with 34% unfertilized and 29% fertilized, with an absolute production of 6.37kg / m².
7. The Slonovo Uvo variety, the only variety in the experience, surpassed the Napoca F1 hybrid in both variants reaching the fertilized pest of 58 t / ha.

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