

THE INFLUENCE OF CULTIVAR X FERTILIZER DOZE X MULCHING ON A SWEET PEPPER CROP FROM POLYTUNNELS IN A SUSTAINABLE SYSTEM

INFLUENȚA INTERACȚIUNII CULTIVAR X DOZA DE ÎNGRĂȘĂMÂNT X MULCIRE LA CULTURA DE ARDEI GRAS ÎN SOLARII ÎNTR-UN SISTEM SUSTENABIL

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Abstract. *At this moment the sustainable agriculture is attractive for consumers too, as a result of the agricultural products: "clean", unpolluted, rich in nutritive compounds. Sweet peppers crop in sustainable system relies on biodegradable resources within the framework of vegetable systems. The using of poultry manure for organic fertilization has allowed obtaining early and entirely high-quality productions and has ensured economic efficiency and environmental conservation.*

Key words: cultivar, fertilizer, mulch, pepper, sustainable system

Rezumat. *In prezent, agricultura sustenabila este atractiva si pentru consumatori, prin produsele agricole, "curate"- nepoluate, bogate in compusi nutritivi. Tehnologia de cultivare a ardeiului in sistem sustenabil se bazeaza pe resurse regenerabile in cadrul sistemelor legumicole. Gunoiul de pasare folosit pentru fertilizarea organica a permis obtinerea unor productii timpurii si totale de calitate superioara si a asigurat eficienta economica si conservarea mediului.*

Cuvinte cheie: cultivar, îngrășământ, mulci, ardei gras, sistem sustenabil

INTRODUCTION

The fresh vegetables and especially solanaceous species for fruit whose edible parts are not missing from the daily diet people. The quality of these vegetables and especially of sweet peppers is given mainly by the high in bioactive principles of vitamins and nutrients necessary for the body. This is even more important as that known to obtaining early productions and high quantity in protected areas using large amounts of nutrients and pesticides. In this context, and integrates this paper which has to use the input of biodegradable and traditional cultivar of growing peppers in the polytunnels, to ensure that the healthy fruit, and improve or maintain soil fertility.

MATERIAL AND METHOD

The purpose of the researches was to evaluate the possibilities of promoting the cultivation technologies in a sustainable system of sweet pepper and improving some technological links in accordance with sustainable principles.

The researches were organized by SC Starwood Gropeni SRL, located in Romania, Braila county, in the period of 2006 – 2008 in polytunnels, complying with the sustainable agricultural principles.

The experiment was of polyfactorial type, organized in subdivided plots with 18 versions (3A x 3B x 2C) in three repetitions. Factor A was the cultivar (a₁- Galben superior (Superior Yellow), a₂- Ohad F₁, a₃-Bianca F₁), factor B was the fertilizing version (b₁-unfertilised, b₂- chicken manure of 4 years 18 t/ha, b₃-chicken manure of 4 years 30 t/ha), and factor C was the mulching method (c₁-unmulched, c₂-mulched with black plastic).

The experimental versions were set in single polytunnels of 380 m². The area of an experimental plot was 9.2 m², corresponding with 2.5 plants/m². The total number of experimental plots was 54.

The producing of seedling was done starting with January 15 in nutrient cubes with the side of 6 cm, being made up of milled and dehydrated peat. The setting up of the crop was done using the seedling of 55-57 days old.

The production of sweet pepper was observed since June to the end of September. The early yield, for the south-eastern part of Romania, is considered the one that is obtained until July 20.

The experimental data were processed through the analysis of variance (Saulescu, 1967), and the significance of differences was estimated through the limit differences.

RESULTS AND DISCUSSIONS

On the during of the experimental period (2006-2008), early production of sweet pepper ranged from 13,75 t / ha for Ohad hybrid , unfertilized and unmulched to 24,97 t / ha for Bianca F1 fertilized with poultry manure of 30t/ha and biodegradable mulch with black film .In this period the greatest productions were obtained in variants fertilized with 30 t chicken manure and mulched, regardless of cultivar (Ohad F1 - 22,42 t / ha, Yellow Superior - 22,66 t / ha, Bianca F1 - 24,97 t / ha).

The greatest yield of Galben Superior (table 1) was done by fertilising with 30 t/ha in mulched version (22.66 t/ha), getting very significant differences (7.92 t/ha), compared to the interaction of unfertilised factors x unmulched (14.74 t/ha). As regards the dose of manure, it was noticed that, in the case of the same cultivar, by fertilising it with 18 t/ha in the mulched version, there was obtained an yield of 20.63 t/ha, and the differences to the unmulched version was of 1.63 t.

The greatest early yield was obtained for the Bianca F1 hybrid, during the period when the study was carried on. The chicken manure fertilising version of 30 t/ha x mulched obtained the greatest early yield (24.97 t/ha).

Very significant differences were noticed in fertilised version with 30 t/ha x unmulched (23.17 t/ha), getting the differences of 10.73 t/ha and 8.93 t/ha respectively. Concerning Ohad F1 hybrid, the greatest early yield was obtained when it was fertilised with 30 t/ha chicken manure (22.42 t/ha).

The poorest early yields were obtained for the Ohad F1 cultivar, at the interaction of factors: unfertilised x unmulched (13.75 t/ha), unfertilised x mulched (14.65 t/ha).

The data on the influence of the fertiliser system of the type of mulch on total production of sweet pepper are presented in table 2.

In the experimental period, total production increased from 27,44 t / ha on Galben Superior (unmulched and unfertilized) to 44,56 t / ha for hybrid Ohad, fertilized with 30 t / ha chicken manure and mulch with plastic.

The Galben Superior cultivar obtained the greatest total yield when it was fertilised with 30 t/ha chicken manure x mulched, (43.24 t/ha). Diferentele de productie prin compararea rezultatelor dintre variantele experimentale au variat de 0.65 t/ha pana la 15.80 t/ha. Very significant positive difference were obtained by comparing to the unfertilised x unmulched version (15.80 t/ha) and unfertilised x mulched version (14.50 t/ha).

The Bianca F1 hybrid, being fertilised with 30 t/ha of manure x unmulched got the biggest yield (44.26 t/ha) and the version fertilised with 30 t/ha x unmulched got 41.81 t/ha. Very significant differences are noticed when comparing the version fertilised with 18 t/ha x mulched with the version unfertilised x unmulched (15.56 t/ha).

In what concerns the influence of manure and mulch type hybrid Ohad, we can say that production ranged from 27.48 t / ha in unfertilized variant and unmulched to 44.56 t / ha in variant mulch and fertilized with 30 t / ha chicken manure. differences by comparing combination of production ranged from 1.56 t / ha (b1c2 - b1c1) to 17.08 t / ha (b3c2 - b1c1).

Very significant differences were obtained when comparing the version fertilised with 30 t/ha x mulched to the version unfertilised x mulched (15.52 t/ha).

CONCLUSIONS

Bianca F1 Hybrid obtained the biggest early yield during the period when the study was carried on variant fertilized with 30 t/ha chicken manure and mulched– 24.97 t/ha.

Ohad F1 hybrid obtained the biggest total yield when it was fertilised with 30 t/ha of chicken manure. The two hybrids that were studied obtained bigger yields, compared to the Galben superior variety.

The cultivars of the study obtained the poorest yields in the unfertilised versions for early and total yield

Table1

The influence of the cultivar interaction x dose of compost x the version of mulching on the early yield of sweet pepper in a sustainable system, for the same graduation of the cultivar

The studied factors	The cultivar								
	Galben superior			Bianca F1			Ohad F1		
	The early yield (t/ha)	Difference (t/ha)	Significance	The early Yield (t/ha)	Difference (t/ha)	Significance	The early Yield (t/ha)	Difference (t/ha)	Significance
b ₁ C ₂ -b ₁ C ₁	15.38-14.74	0.64		15.33-14.24	1.09		14.65-13.75	0.90	
b ₂ C ₁ -b ₁ C ₁	19.00-14.74	4.26		20.85-14.24	6.61		18.97-13.75	5.22	
b ₂ C ₂ -b ₁ C ₁	20.63-14.74	5.89		23.38-14.24	9.14	**	20.73-13.75	6.98	*
b ₃ C ₁ -b ₁ C ₁	21.06-14.74	6.32	*	23.17-14.24	8.93	**	20.96-13.75	7.21	*
b ₃ C ₂ -b ₁ C ₁	22.66-14.74	7.92	*	24.97-14.24	10.73	**	22.42-13.75	8.67	**
b ₂ C ₁ -b ₁ C ₂	19.00-15.38	3.62		20.85-15.53	5.32		18.97-14.65	4.32	
b ₂ C ₂ -b ₁ C ₂	20.63-15.38	5.25		23.38-15.53	7.85	*	20.73-14.65	6.08	
b ₃ C ₁ -b ₁ C ₂	21.06-15.38	5.68		23.17-15.53	7.64	*	20.96-14.65	6.31	*
b ₃ C ₂ -b ₁ C ₂	22.66-15.38	7.28	*	24.97-15.53	9.44	**	22.42-14.65	7.77	*
b ₂ C ₂ -b ₂ C ₁	20.63-19.00	5.25		23.38-20.85	2.53		20.73-18.97	1.76	
b ₃ C ₁ -b ₂ C ₁	21.06-19.00	2.06		23.17-20.85	2.32		20.96-18.97	1.99	
b ₃ C ₂ -b ₂ C ₁	22.66-19.00	3.66		24.97-20.85	4.12		22.42-18.97	3.45	
b ₃ C ₁ -b ₂ C ₂	21.06-20.63	0.43		23.17-23.38	-0.21		20.96-20.73	0.23	
b ₃ C ₂ -b ₂ C ₂	22.66-20.63	2.03		24.97-23.38	1.59		22.42-20.73	1.69	
b ₃ C ₂ -b ₃ C ₁	22.66-21.06	1.60		24.97-23.17	1.80		22.42-20.96	1.46	

DL 5%= 6.27

DL 1%= 8.60

DL 0.1%= 11.71

Table 2

The influence of the cultivar interaction x dose of compost x the version of mulching on the total yield of sweet pepper in a sustainable system

The studied factors	The cultivar								
	Galben superior			Bianca F1			Ohad F1		
	The total yield (t/ha)	Difference (t/ha)	Significance	The total yield (t/ha)	Difference (t/ha)	Significance	The total yield (t/ha)	Difference (t/ha)	Significance
b ₁ C ₂ -b ₁ C ₁	28.74-27.44	1.30		29.14-27.51	1.63		29.04-27.48	1.56	
b ₂ C ₁ -b ₁ C ₁	36.72-27.44	9.28	***	37.88-27.51	10.37	***	37.94-27.48	10.46	***
b ₂ C ₂ -b ₁ C ₁	39.02-27.44	11.58	***	41.07-27.51	15.56	***	40.82-27.48	13.34	***
b ₃ C ₁ -b ₁ C ₁	39.67-27.44	12.23	***	41.81-27.51	14.30	***	42.03-27.48	14.55	***
b ₃ C ₂ -b ₁ C ₁	43.24-27.44	15.80	***	44.26-27.51	16.75	***	44.56-27.48	17.08	***
b ₂ C ₁ -b ₁ C ₂	36.72-28.74	7.98	***	37.88-29.14	8.74	***	37.94-29.04	8.90	***
b ₂ C ₂ -b ₁ C ₂	39.02-28.74	10.28	***	41.07-29.14	11.93	***	40.82-29.04	11.78	***
b ₃ C ₁ -b ₁ C ₂	39.67-28.74	10.93	***	41.81-29.14	12.67	***	42.03-29.04	12.99	***
b ₃ C ₂ -b ₁ C ₂	43.24-28.74	14.50	***	44.26-29.14	15.12	***	44.56-29.04	15.52	***
b ₂ C ₂ -b ₂ C ₁	39.02-36.72	2.30	*	41.07-37.88	3.19	**	40.82-37.94	2.88	*
b ₃ C ₁ -b ₂ C ₁	39.67-36.72	2.95	**	41.81-37.88	3.93	**	42.03-37.94	4.09	***
b ₃ C ₂ -b ₂ C ₁	43.24-36.72	6.52	***	44.26-37.88	6.38	***	44.56-37.94	6.62	***
b ₃ C ₁ -b ₂ C ₂	39.67-39.02	0.65		41.81-41.07	0.74		42.03-37.94	4.09	***
b ₃ C ₂ -b ₂ C ₂	43.24-39.02	4.22	***	44.26-41.07	3.19	**	44.56-40.82	3.74	**
b ₃ C ₂ -b ₃ C ₁	43.24-39.67	3.57	**	44.26-41.81	2.45	*	44.56-42.03	2.53	*

DL 5%= 2.06

DL 1%= 2.89

DL 0.1%= 3.96

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