

The Influence of Fructification Managing and Fertilization on Medium-Long Fruit Cucumber Hybrids Cultivated in Greenhouse

MANIUTIU Danut¹⁾, Rodica SIMA¹⁾, Diana FICIOR¹⁾

¹⁾ *University of Agricultural Sciences and Veterinary Medicine, Faculty of Horticulture, 3-5 Mănăştur Street, 400372, Cluj-Napoca, Romania, e-mail: dan_maniutiu@yahoo.com*

Abstract

In the experiments effectuated in 2007, at the University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania, in a "Venlo" type greenhouse, the fructification managing and fertilization of medium-long fruit cucumbers was studied. During the experiment, observations regarding early and total yield as well as fruit commercial quality have been done. For the variant for which fruits were placed both on the main stem and on the shoots early yield efficiencies of 30.7% and total yield efficiencies of 22.9% were recorded in comparison with the variants for which the fruits were placed just on the main stem. The fertilization way influenced both early and total yield difference significant positive being recorded in case of root + foliar fertilization given the root fertilization. Under combined influence of experimental factors, both for early and for total yield, the best results were obtained by variant with managing of fructification both on main stem and shoots, root + foliar fertilized.

Keywords: medium-long fruit cucumbers, greenhouse, fructification managing and fertilization

Introduction

Medium- long fruit cucumbers spread in production in the Central and South Europe, inclusively as forced and protected crops, due to their lower temperature requirements in comparison with long fruit hybrids. On this purpose parthenocarpic hybrids, bitter free, tolerant or resistant at certain diseases have been created (Chaux and Fory, 1994).

In the specialty literature doesn't exist a real difference regarding the fructification managing between long fruit and medium-long fruit cucumbers, fact which mattered in the approach of this study.

Materials and methods

In the experiment was used Alamir F₁, a cucumber hybrid with medium-long fruit, produced by Nunhems, a Dutch seed company. The fruits have 16-20 cm length; they are equable, dark green colored and easy striated. It is a hybrid which has resistance at thermal stress, poor light and resistant at powdery mildew and CMV.

To establish some technological sequences to medium-long fruit cucumbers cultivated in greenhouse a bifactorial experiment has been organized in 2007 at University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania.

Factor A: fructification managing:

a₁ – fructification on main stem

a₂ – fructification on main stem and on fruit bearing springs

Factor B: fertilization managing

b₁ – root fertilization

b₂ – root and foliar fertilization

By factors combination have resulted four experimental variants presented in Table 1.

Each experimental variant has been placed in four repetitions, the surface of experimental plot being 9.6 m², with 24 plants.

Culture has been established in 27.02.2008 with seedling produced in pots with 10 cm diameter. Pots have been filled with growing medium.

During vegetation period plants from variants I and II have yielded only on the main stem, with one fruit at each stem node. Plants from variants III and IV have yielded on

Table 1 Experimental variants, Cluj-Napoca, 2007

Variant	Fructification method	Fertilization method
I a ₁ b ₁	fructification on main stem	root fertilization
II a ₁ b ₂	fructification on main stem	root and foliar fertilization
III a ₂ b ₁	fructification on main stem and on fruit bearing springs	root fertilization
IV a ₂ b ₂	fructification on main stem and on fruit bearing springs	root and foliar fertilization

Table 2 Unilateral influence of fructification method on early yield (at 31.05.2007) at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
fructification on main stem	6.23	100.0	-	-
fructification on main stem and on fruit bearing springs	8.14	130.7	+1.91	**
DL 5%			0.75	
DL 1%			1.38	
DL 0.1%			3.05	

main stem and on fruit bearing springs. After plants have reached 1.5 m there has been left a lateral shoot to each stem node. The shoots have been pinched out after a fruit and a leaf. Phasial fertilizations with Fertisoil 20:5:16 in concentration 1% have been applied two times per week to all variants. Variants II and IV have been also weekly fertilized with a foliar fertilizer Ferticare 24:8:16 in concentration 0.5%.

Results and discussion

Early yield

Analyzing the influence of fructification on the early yield (at 31.05.2007) at medium long fruit cucumbers (Table 2) it can be noticed that variants with fruits on main stem and on fruit bearing springs have realized yield increases of 30,7%, difference given the control (fructification on main stem) being distinct significant.

Regarding the unilateral influence of fertilization method on the early yield (Table 3) variants with root and

foliar fertilization have realized a yield increase distinct significant positive given the control (root fertilization).

Analyzing the combined influence of both factors on greenhouse medium-long cucumbers early yield (Table 4) it can be noticed that variant IV (fructification on main stem and on fruit bearing springs + root and foliar fertilization) has realized the best results with a yield increase about 59.1%, difference given the control (variant I – fructification on main stem and root fertilization) being very significant.

Variant III (fructification on main stem and on fruit bearing springs + root fertilization) has registered a yield difference positive very significant given the control.

Variant II (fructification on main stem + root and foliar fertilization) has not realized a significant yield difference given the control but still it realized a yield increase about 17.8%.

Total yield

Results concerning total yield have confirmed the results obtained for early yield.

Table 3 Unilateral influence of fertilization method on early yield (at 31.05.2007) at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
root fertilization	6.45	100.0	-	-
root and foliar fertilization	7.92	122.9	+1.47	*
DL 5%			1.11	
DL 1%			1.67	
DL 0.1%			2.69	

Table 4 Combined influence of both factors on early yield (at 31.05.2007) at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
fructification on main stem + root fertilization	5.72	100.0	-	-
fructification on main stem and on fruit bearing springs + root fertilization	6.74	117.8	+1.02	-
fructification on main stem + root and foliar fertilization	7.17	125.3	+1.45	*
fructification on main stem and on fruit bearing springs + root and foliar fertilization	9.10	159.1	+3.38	***
DL 5%			1.33	
DL 1%			2.12	
DL 0.1%			3.79	

Table 5 Unilateral influence of fructification method on total yield at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
fructification on main stem	9.08	100.0	-	-
fructification on main stem and on fruit bearing springs	11.15	122.9	+2.08	*
DL 5%			1.25	
DL 1%			2.30	
DL 0.1%			5.10	

Table 6 Unilateral influence of fertilization method on total yield at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
root fertilization	9.40	100.0	-	-
root and foliar fertilization	10.84	115.3	+1.44	*
DL 5%			1.10	
DL 1%			1.66	
DL 0.1%			2.66	

Analyzing the unilateral influence of fructification on total yield at medium-long fruit cucumbers (Table 5) it can be noticed that variants with fructification on main stem and on fruit bearing springs have realized yield increases about 22.9%, comparative with control (fructification on main stem).

Under unilateral influence of fertilization method (Table 6) it can be noticed that root and foliar fertilization has registered positive significant yield differences comparative with root fertilization.

Analyzing the combined influence of both factors on greenhouse medium-long cucumbers total yield (Table 7) it can be noticed that, like in the case of early yield, variants IV (fructification on main stem and on fruit bearing springs + root and foliar fertilization) and III (fructification on main stem and on fruit bearing springs + root fertilization) have realized the best results differences given the control (variant I – fructification on main stem and root fertilization) being positive distinct significant respectively positive significant.

Commercial quality of production

Table 7 Combined influence of factors on total yield at medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Early yield kg/m ²	%	Difference ±	Significance of difference
fructification on main stem +root fertilization	8.54	100.0	-	-
fructification on main stem and on fruit bearing springs + root fertilization	9.61	112.5	+1.07	-
fructification on main stem +root and foliar fertilization	10.24	119.9	+1.70	*
fructification on main stem and on fruit bearing springs + root and foliar fertilization	12.06	141.2	+3.52	**
DL 5%			1.65	
DL 1%			2.77	
DL 0.1%			5.37	

From yield commercial quality analyze (table 8) it can be noticed that percent of first quality fruits was between 74.23 and 79.02% without major differences between experimental variants.

Variant IV (fructification on main stem and on fruit bearing springs + root and foliar fertilization) has registered the most first quality fruits (9.53 kg/m²).

Comparative with control the highest volume of first quality fruits was realized by variant IV with 150.31% due to higher yield realized by this variant.

Conclusions

After the experiment effectuated in 2007 on the medium-long fruit greenhouse cucumbers culture the following conclusions can be inferred:

The early and total yield was influenced especially by fructification method but also by fertilization method. Under combined influence of both factors the best results concerning both early and total yield have registered by variant IV with fructification on main stem and on fruit bearing springs and with root and foliar fertilization. Vari-

Table 8 Commercial quality of greenhouse medium-long fruit cucumbers, Cluj-Napoca, 2007

Variant	Production (kg/m ²)			First quality fruits %	
	Total	I st quality	II nd quality	From total	Comparative with control
I	8.54	6.34	2.20	74.23	100.00
II	9.61	7.18	2.43	74.71	113.24
III	10.24	7.83	2.41	76.46	123.50
IV	12.06	9.53	2.53	79.02	150.31

ant IV has registered an early yield increase of 59,1%, very significant given the control and a total yield increase of 41.2%, distinct significant given the control (variant I with fructification on main stem and root fertilization).

Commercial quality of production was not significant influenced neither by fructification method nor by fertilization method, percent of first quality fruits was 74.23-79.02% from total.

In conclusion, increasing of fruit charge by fructification on main stem and fruit bearing springs, in conditions of a proper root and foliar fertilization that assures the nutritive substances and intensifies the root absorption, will determine significant yield increases for both early and total yield.

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