THE INFLUENCE OF WATERING TECHNIQUE AND ASSORTMENT ON PRODUCTION AND QUALITY OF PLASTICHAUSES TOMATOES

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Abstract

Early tomatoes crops in solarium in the Vidra vegetable garden have been characterized in the last years by a technological delay with negative effects on production and its quality.
Because the construction of modern solariums in the area is an expensive activity, the producers' interest was focused on perfecting some technological branches such as: modernizing the assortment, using the irrigation through dripping installations for fertilization and irrigation, introducing new effective measures of ensuring the pollination.
The present paper presents the results of a research based on the introduction in the Vidra crop solariums technology of some new elements, with positive effects on the level and quality of tomatoes' production.
***Key words**: tomatoes in solarium, assortment, irrigation through dripping*

Experimental

The bifactorial experience was set up in a Vidra private producer's solarium, in the period 2004 – 2006. Within the framework of the experiment the variants presented in table 1 were studied.

Table1: Experimental variants

Var. Nr.	Watering technique (a)	Cultivars (b)	
		Name	Mading
1	culvert (a_1)	Arletta F_1 (b_1)	Royal Sluis, Olanda
2		Electra F_1 (b_2)	Hazera, Israel
3		Francesca F_1 (b_3)	Hazera, Israel
4		Margarita F_1 (b_4)	Hazera, Israel
5		Abigail F_1 (b_5)	Hazera, Israel
6	dripping (a_2)	Arletta F_1 (b_1)	Royal Sluis, Olanda
7		Electra F_1 (b_2)	Hazera, Israel
8		Francesca F_1 (b_3)	Hazera, Israel
9		Margarita F_1 (b_4)	Hazera, Israel
10		Abigail F_1 (b_5)	Hazera, Israel

For achieving the experimental methods some new production implementations were used, the most important are the following:

New tomatoes hybrids – Electra F_1, Francesca F_1, Margarita F_1 and Abigail F_1, recently created by Hazera Co. from Israel, have big size fruits, with a nice commercial appearance, adequate from these points of view to the present requirements and to the Romanian consumers' sight.

Besides these ones the early hybrid Arletta F_1, of Dutch origin, was used as a test specimen cultivated for more than 10 years in Vidra vegetable gardening are with very good results. The produces irrigated through dripping were made using a Queen Gil irrigation system featuring an irrigation probe which allows the insertion of soluble fertilizers in the soaking water.

The fertilization was made by using some complex soluble fertilizers, produced by Scott's Co. The main specific elements of the crop technology applied in the experiment are the following:

The solarium used was of block type, with a surface of 1000m², with a wooden skeleton and with a rooftop height of 200, and the distance between two supports beams of 650 cm.

The seedlings were produced using classical technology, in a hotbed surface arranged in an individual solarium, with double protection and with interior space heating capabilities.

The crop was planted in semi decade 20 – 25 of March, at an average distance of 82 cm between the rows and 25 cm between each plant on the row.

The plants were removed their secondary scions at 4 inflorescences and were supplementary pollinated with the help of bumble bees from a Naturpol XS hive with a use period of 6 weeks.

The ingathering was performed in dynamics, with the production and its quality recorded. Early and total production was statistically interpreted by using the variant analysis method.

Other observations and determinations aimed the establishment of calendar timing of the main phases and the registration of some quantitative features meant for characterizing the ingathering fruits from previous experience.

The duration of the vegetation period expressed in number of days is differs depending on the earliness of the crops and on the influence of the watering method. For the produces irrigated through dripping, the fist getting in were with 6 – 8 days earlier than the similar periods of the produces irrigated on culverts.

From the 4 new hybrids, if Abigail F1 is characterized by the earliness, similar with the control, its vegetation period being identical to the hybrid Arletta F1.

The data regarding the fruits' average weight emphasizes the fact that Electra F1, it's characterized by big fruits (183,6 – 198,4g), overtaking from this point of view the average weight of the other 4 crops. This large average weight of this hybrid's fruits produces problems in selling the production, because the great majority of the consumers prefer smaller tomato fruits. Irrigation through dripping has determined the increase in the average weight of fruits with an average of 5 – 7 % up to the similar parameter recorder for the similar variants irrigated on the row.

Generally, early production can be appreciated as being very good in comparison with average productions obtained by other farmers in this area.

Francesca F1, (5,880 kg/m^2) and Electra F1, (5,530 kg/m^2) are notable through early high production especially to the produces irrigated through dribble.

The total production presented in Table 2 can be also seen as a very good one for Vidra area. The most performing productions (V_2, V_7, V_8 si V_{10}) are outrunning 10 – 11kg/m^2. This level of production is overtaking so much the production of control Arletta F_1 as the one usually obtained for the great majority of the Vidra area producers which are cultivating solarium tomatoes in short cycle.

The data regarding total production represented in kg/m^2 and tide up on variants and repetitions were statistically interpreted using variant analysis method specific to bi factorial experiments.

From the synthesis table in which numerous multiple comparisons are made, two of them are presented in the present paper.

Table 2: Number of fruits, average weight and production

Var.nr.	Mass (g)	Production (kg/m^2)	Product yield	
			Kg/ plant	Kg/m^2
1	141,4	4,43	1,84	8,82
2	183,6	4,87	2,21	10,61
3	144,3	4,63	1,93	9,25
4	144,3	5,41	1,86	8,93
5	152,3	4,99	2,12	10,11
6	149,1	4,97	1,92	9,21
7	198,4	5,53	2,41	11,57
8	155,0	5,88	2,18	10,46
9	141,2	6,16	1,95	9,36
10	165,2	5,74	2,31	11,02

Results and Discussions

Synthesis data from table 3 scales average production of the 5 hybrids realized to the 2 variants of watering technique. In these conditions, Electra F_1, surpasses control (V1) with 2,080kg/m^2, this positive difference being very significant. The difference of + 0,840kg/m^2 between Margarita F_1 production and the control has also statistical guarantee by being significant.

Table 3: The influence of the assortment over average production of irrigated variants on the culvert and through dripping

Nr crt.	Cultivars	Production (kg/m^2)	Difference de production (kg/m^2)	Production, %	Difference de production, %	Signification
1	Arletta F_1	9,01	-	100,00	-	-
2	Electra F_1	11,09	2,08	123,85	+ 23,85	xxx
3	Francesca F_1	9,85	0,84	109,32	+ 9,22	x
4	Margarita F_1	9,14	0,13	101,44	+ 1,44	-
5	Abigail F_1	9,28	0,27	102,99	+ 2,99	-

Dl – 5% ----------0,29 kg/m^2
Dl – 1%---------- 0,87kg/m^2
Dl – 0,1%----------1,37kg/m^2

The watering technique influences the level of total production. The average production of the 5 hybrids used in this experiment, overcomes for the irrigated through dripping variants, with a significant difference, the similar production realized for the similar variants irrigated on the culvert (table 4).

Table 4: The influence of the manner of applying the watering on average production of experimental hybrids

Nr crt.	Watering technique	Production (kg/m^2)	Difference de production (kg/m^2)	Average Production %	Difference de production %	Signification
1	culvert	9,40	-	100,00	-	-
2	dripping	10,15	0,75	107,97	+ 7,97	x

Dl – 5% ----------0,29 kg/m^2
Dl – 1%---------- 0,87kg/m^2
Dl – 0,1%----------1,37kg/m^2

Although within the framework of this paper, data related to economical efficiency are not presented, we are mentioning that the profitability of solarium tomatoes crop is insured from a level of production of over 9 kg/m^2.

Conclusion

Based on the presented and discussed results, the following conclusions can be formulated:

1. Short cycle production performances of tomatoes crops in the Vidra vegetable garden can be improved.
2. A simple way of improving them is the introduction of new early productive hybrids in the crop, with resistance or tolerance to diseases and pests and with high quality fruits.
3. Among the hybrids used in the experiment, Electra F_1 (11,54kg/m^2) and Margarita F_1 (10,460kg/m^2) comply to these requirements which surpass the test specimen with substantial differences of 1,5 – 1,8 kg/m^2.
4. As earliness, we can distinguish Francesca F_1 (6,160kg/m^2) and Margarita F_1 (5,880kg/m^2) which surpass the test specimen (Arletta F1) with 1,45 – 1,73kg/m^2.
5. Irrigation through dripping significantly contributes to the increase in total productivity in comparison with the one of irrigation on the culvert.

Based on previous conclusions, the tomatoes hybrids production extension Electra F_1 and Margarita F_1 is recommended, for cultures in cycle are irrigated through dripping.

References

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