

# THE INFLUENCE OF SOME AGRO-TECHNOLOGICAL FEATURES ON THE CUCUMBER YIELD FROM PLASTIC TUNNELS IN THE WESTERN AREA OF ROMANIA

## INFLUENȚA UNOR PARTICULARITĂȚI AGROTEHNOLOGICE ASUPRA PRODUCȚIEI DE CASTRAVEȚI DIN SOLARIII, ÎN ZONA DE VEST A ROMÂNIEI

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**Abstract.** *In household systems, cucumbers are cultivated on a large scale in solariums, so as to obtain both early and summer-autumn productions of semi-long and small (cornichon-type) fruits. The crops are placed in specially designed solariums or are transplanted in hotbeds, in case of thermophilic crops. The experiment was meant to indicate the effect of mulching the soil, and that of plants closeness to one another, upon the quantitative and the qualitative production of cucumbers, at a summer-autumn crop, using a small-fruit hybrid, intended for conservation.*

**Key words:** production of cucumbers, solariums, agro-technological features

**Rezumat.** *Cultura castraveților în solarii are o extindere mare în sistem gospodăresc pentru obținerea de producții timpurii dar și de vară toamnă, folosindu-se cultivare cu fructe semilunghi respectiv, mici, de tip cornichon. Cultura se practică în solarii special amenajate sau după producerea de răsaduri destinate culturilor termofile. În experiență s-a urmărit efectul mulcirii solului și a desimilor diferite, asupra producției cantitative și calitative de castraveți, la o cultură de vară-toamnă, utilizându-se un hibrid cu fructe mici, destinat pentru conservare.*

**Cuvinte cheie:** producția de castraveți, solarii, particularități agrotehnologice

### INTRODUCTION

In recent years, cucumber crops have become more and more extended in solariums, as such forms of production are safer than the ones grown in open-fields (Apahidean Al.S. et al., 2003). Solarium production can be meant for either immediate consumption, when obtained from early cultures, or for conservation, when resulting from the summer-autumn crops.

Cucumber is a species that requires a special humidity regime, both in the soil (75-80% of the field capacity until fruition and 80-85% during fruition) and in the atmosphere (Domuța C., 2005). Therefore, providing adequate quantities of water during the growing season, largely conditions the production achieved.

## MATERIAL AND METHOD

The experiment presented here describes the cornichon-type crop obtained in solarium conditions, in a conventional cultivation system, with black polyethylene mulch, or non mulch varieties; the Szatmar F<sub>1</sub> hybrid cucumber has been used, the different planting distances between plants in row being of 20, 30 and 40 cm (Table 1).

Table 1

Experimental varieties

Variety	Mulch	Distances between the plants in a row	Hybrid-type
I	Non-mulch	20 cm	Szatmar F <sub>1</sub>
II	Non-mulch	30 cm	Szatmar F <sub>1</sub>
III	Non-mulch	40 cm	Szatmar F <sub>1</sub>
IV	Black polyethylene mulch	20 cm	Szatmar F <sub>1</sub>
V	Black polyethylene mulch	30 cm	Szatmar F <sub>1</sub>
VI	Black polyethylene mulch	40 cm	Szatmar F <sub>1</sub>

The preparation of the land took place after the previous crop (tomatoes) was removed, vegetable waste being collected and turned into compost. The soil was fertilized with 70 t/ha of decomposed manure, 300 kg/ha of super-phosphate, and 200 kg/ha of calcium sulfate (Apahidean Al.S. et al., 1999). The incorporation of fertilizers was done by plowing with the help of a motor plough, at a depth of 26 cm. All these activities started in early September. Until establishing the cucumber crop, a strawberry culture was placed in mid September, which was subsequently removed in June. After removing the strawberry plant remains, the land was fertilized with 250 kg/ha nitrogen. Using the black polyethylene mulch (Draghici Elena, Ruxandra Ciofu, 1998) prevented the emergence of weeds, which appeared only on traffic lanes, on the edges of the solarium and at non-mulched variants.

The setting of the crop was done by directly placing two seeds in a nest, in accordance with the research scheme. The sowing was done on the 24<sup>th</sup> of June.

Until the emergence of plants, watering was ensuring by using a hose with filter; it was done daily, early in the morning. Due to high temperatures during the day, besides the drip irrigation, watering was also ensured by a hose with filter, after sunrise, for a period of 10 days. Until the end of the crop, watering was ensured weekly, depending on the phenophase.

Soon after sunrise, the support system was being mounted, using plastic mesh fences, which are much easier to install and more efficient at directing cucumber stalks. Both the main stem and side shoots were directed on this fence, weekly adjustments being performed.

Particular attention was given to the microclimate of solariums. In July and August high temperatures, of 40° C and even more, were recorded in solariums and therefore all ventilation mechanisms were used.

The relative humidity of the air ranged between 60-90%. August was very warm month as well, but the relative humidity of the air was of 75-90%, due to the more abundant vegetation. September brought lower temperatures and, alongside the decrease of the minimum temperatures outside, solariums were closed during the night (Ciofu Ruxandra, et al., 2004).

During the growing period, the cucumbers in the classical culture were fertilized only by the irrigation water. The first supply of Fericare II K was done on the 15<sup>th</sup> day from sprouting, the action being repeated every 15 days with Fericare III K and

Fertiicare Ca K respectively; in addition, at the beginning of flowering, three polyethylene mulching have been applied (Davidescu D. Velicia Davidescu, 1992).

The protection of solarium-grown crops against pests and diseases was ensured through the application of treatments with Dithane M 45, Curzale Manox, Aliette 80 WP (for disease prevention); for the prevention and control of pests, aphids more specifically, Calypso and Confide 200 SL have been used.

## RESULTS AND DISCUSSIONS

Due to favorable temperatures, specific to the North-Western part of our country, the crop could be continued until early October, a situation that is not possible in other areas of the country. Analyzing the overall dynamics of harvesting, which is the result of agro-technological peculiarities associated with the crop, in 2008 we could observe the influence of such factors, applied to specific situations. The first harvest began in the second decade of July, on the 18<sup>th</sup> of July respectively. The first harvesting began in the second decade of July, more exactly on the 18th of July. The entire harvesting period was of 81 days. Data referring to the dynamic of harvesting in terms of months and decades, for each variant (average productions), are presented in table 2.

Table 2

**Harvesting Dynamics  
Husasău de Tinca, 2008 (Kg/m<sup>2</sup>)**

V a r i a n t	Months and decades										
	July		August				September			October	
	2	3	1	2	Early production	3	1	2	3	1	Total production
1	-	0,23	0,38	0,47	1,17	0,67	0,31	0,48	0,33	0,25	3,21
2	0,18	0,37	0,48	0,65	1,68	0,69	0,43	0,51	0,34	0,21	3,86
3	-	0,12	0,45	0,58	1,15	0,72	0,67	0,58	0,49	0,34	3,95
4	-	0,13	0,25	0,35	0,73	0,73	0,58	0,64	0,45	0,49	3,62
5	0,34	0,47	0,62	0,55	1,98	0,95	0,83	0,77	0,54	0,20	5,27
6	0,21	0,30	0,46	0,45	1,42	0,89	0,63	0,76	0,63	0,51	4,84

The intervals of harvesting were, in relation to the stage of fruit growth, of 2-4 days. Fruits were gathered in the morning, as they were more turgescient at that time of the day. To the possible extent, small and extra quality, or first quality fruit were gathered though, given the rich foliage, fruit of larger dimensions have also been harvested.

As table 2 indicates, the dynamics of production was generally better at black polyethylene mulch types.

In terms of production, the differences between variants were significant. Of the six variants, only two variants were able to exceed the average of the experiment. The best results were obtained at the black polyethylene mulch type and a 30 cm density of the Szatmar F1 hybrid, from which 52.7 tons/ha were

harvested, with a production increase of 11.5 t/ha. Difference from the proof was statistically ensured, as it was very significant.

The mulch type with 40 cm distance between nests was able to accumulate, up until the end of the growth period, a quantity of 48.4 t/ha cucumber fruit. As compared to the proof, a 7.2 t/ha higher quantity of cucumbers could be harvested, this difference being significant.

The lowest level of total production was recorded at the non-mulch type, with a 20 cm distance between nests. Cucumber fruits harvested from this variant totaled only 32.1 t/ha, about 9 t/ha less than the average of the experiment and 16.3 t/ha less than the highest production type.

## CONCLUSIONS

1. The best harvesting dynamic could be observed to the type mulched with black polyethylene film, the distance between the plants in a row being of 30 cm.

2. At all mulch types, the harvested yields were higher, on each decade, as compared to the non-mulch types.

3. Production ranged between 36.2 -52.7 t/ha, depending on plant density. The highest production was recorded when a space of 30 cm was left between plants per row, i.e. a density of 44,000 plants/ha.

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