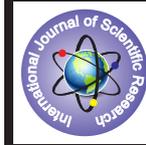


A Comparative Study on Commercial Quality of Two Gherkin Culture Systems: Conventional and Organic



Agriculture

KEYWORDS : conventional, culture systems, organic, quality

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ABSTRACT

The effect of organic fertilizers on cucumber fruit quality compared to chemical fertilizers has been evaluated over a period of three consecutive years. Solarium experiments were conducted in order to study the production quality level of gherkins, for the marketing hybrids Mirabelle, Pasalimo, Szatmar and Crispina, in the pedoclimatic conditions of the Western region of Romania.

Comparing the data of the production level along with the commercial quality, the largest production of quality fruit was obtained in variants mulched with black foil for hybrids Mirabelle and Szatmar where the extra quality production has made a rate over 77% of the total.

In conclusion, in both culture systems, conventional and organic, in the pedoclimatic conditions of the Western region of Romania both chemical fertilizers and organic ones had a positive effect on production of cucumbers for sale in all three experimental years.

INTRODUCTION

Greenhouses vegetable crops require large heating expenditures, which is why greenhouses represent an alternative in terms of getting early vegetables on the market (Mihalache, 2003). Moreover, for small producers, a greenhouse is an investment easier to make. The greenhouse cucumber farming has a large extend in the household system, in order to obtain early and extra-early crops (Apahidean et al., 2000a, 2000b) by using semi-long and small fruit such as cornichon. This kind of culture is practice in specially designed greenhouses or following the production of thermophilic seedlings.

MATERIALS AND METHOD

Organic greenhouse crops use natural fertilizers and extracts for the prevention and control of diseases and pests, whereas for the conventional crop, the traditional greenhouse cucumber production has been applied.

To the basic fertilization, 70 t/ha decomposed manure have been applied to the organic greenhouse crop system while to the traditional greenhouse system (Tuzel et al., 2005), along with manure were also used 300 kg/ha super phosphate and 200 kg/ha calcium sulfate (Davidescu and Davidescu, 1992).

In the organic greenhouse system, 15 days after sprouting, fertilization was made, using 4l ha Agriful, and again 30 respectively 40 days after sprouting.

Soaked poultry manure (decomposed in water, 1:9 dilution, for 5 weeks), at the beginning of the flowering process, and again after 3 weeks. 6 extra root fertilizations were also made using Tecamin Max every 15 days, first application being made at the beginning of flowering.

Cucumbers produced in the traditional cropping system went under fertilization during the vegetation period only through the irrigation water (Suojala et al., 2006). The first administration was made 15 days after sprouting using Feticare II K, and again at 15-day intervals with Feticare III K and Feticare Ca-K; three foliar fertilizations with Kristalon Mg were applied, once with the beginning of flowering.

Harvesting began in the first decade of July and went on until the beginning of October. The rapid growth of the fruit required harvest every 2 days and towards the end of vegetation period, every 3 and 4 days.

RESULTS

Comparative analysis of the quality standards (see Figure 1) for the whole quantity of extra quality fruits, 1st - 2nd quality achieved in the traditional and organic cropping systems

show that the largest quantity of extra quality fruits in black foil mulch versions, in Mirabelle and Szatmar hybrids where the extra quality production recorded a rate of over 77% of the total.



A



B

Figure 1. Classic and ecological cultures: A - Classic culture, B - Ecological culture

The highest quantity was recorded in all versions, in August (2nd and 3rd decades) and September (1st and 2nd decades). Production dynamics was better in Szatmar and Mirabelle hybrids.

The marketing value of the cucumber fruit as an important parameter for the efficient capitalization of cucumbers was analyzed by sorting cucumbers on three quality levels, namely extra quality (3-6 cm), 1st -2nd quality (6-9 cm), 2nd quality (9-12 cm), after each crop in all three experimental years. Following these analyses, it was found that in general good quality fruit were obtained, with larger or smaller differences depending on the version.

Is shown as in Table 1 that mulching and planting density have influenced the quality of cucumber fruit in all analyzed hybrids, so that, in mulched version and for a 44.4 k plants /ha, a higher

percentage of extra quality fruit was achieved compared to the unmulched version.

Table. 1 Average commercial quality of cucumbers Husasău de Tinca 2007 – 2009

| Variant | Extra a. p.* (%) | Variant | Extra a. p.* (%) |
|-----------------------|--------------------|-----------------------|--------------------|
| Culture Hybrid system | Density mii pl./ha | Culture Hybrid system | Density mii pl./ha |
| Unmulched Szatmar | 64.4 | Mulched Szatmar | 64.4 |
| Unmulched Crispina | 64.4 | Mulched Crispina | 64.4 |
| Unmulched Pasalimo | 64.4 | Mulched Pasalimo | 64.4 |
| Unmulched Mirabelle | 64.4 | Mulched Mirabelle | 64.4 |
| Unmulched Szatmar | 44.4 | Mulched Szatmar | 44.4 |
| Unmulched Crispina | 44.4 | Mulched Crispina | 44.4 |
| Unmulched Pasalimo | 44.4 | Mulched Pasalimo | 44.4 |
| Unmulched Mirabelle | 44.4 | Mulched Mirabelle | 44.4 |
| Unmulched Szatmar | 33.3 | Mulched Szatmar | 33.3 |
| Unmulched Crispina | 33.3 | Mulched Crispina | 33.3 |
| Unmulched Pasalimo | 33.3 | Mulched Pasalimo | 33.3 |
| Unmulched Mirabelle | 33.3 | Mulched Mirabelle | 33.3 |

* average production

The analysis of the cucumber fruit in the three experimental years for all studied hybrids in the conventional cropping system, confirms the higher quality of the fruit mulched with black polyethylene, with a 44.4 k plants/ha, which had the highest percentage of extra quality fruit out of the total production. It also shows that in all versions the extra quality had the highest crop quantity, followed by the first quality with average but close values. The second quality was not an important segment of the production in any of the versions but there was though a slight difference between mulched and unmulched versions.

The average analysis of the commercial quality of the cucumber fruits (Table 1) grown in the traditional cropping system in the three experimental years, shows that the highest total output came from the mulched versions with a density of 44.4 k plants/ha and the hybrid Mirabelle shown in Figure 2 stands out with a total average yield of 5.36 kg/m².

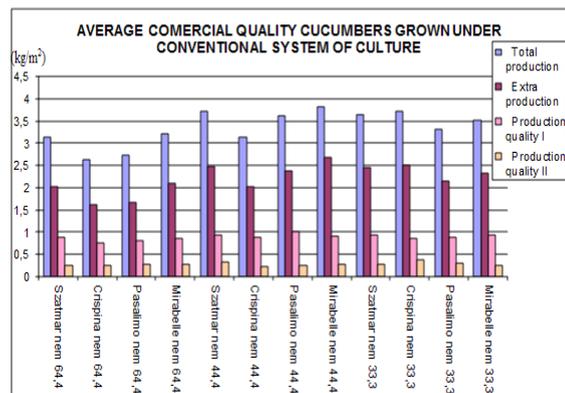


Figure 2. Average commercial quality of Husasău de Tinca 2007 – 2009 cucumbers in unmulched versions

From these 4.13 kg/m² representing a percentage of 77.05%, were extra quality fruit, followed by the hybrid Szatmar with a total average yield of 4.84 kg/m² and 65.73% extra quality fruit. A good percentage of extra quality fruit was also record-

ed for the density of 33.3 k plants/ha in the hybrids Mirabelle (73.06%) and Szatmar (72.00%).

The lowest average percentage of extra quality fruit out of the total was recorded for the unmulched hybrid Crispina with a density of 64.4 k plants/ha, see Figure 3, and the highest average percentage of extra quality fruit for unmulched versions, was obtained by the hybrid Mirabelle at a density of 44.4 k plants/ha (69.71%).

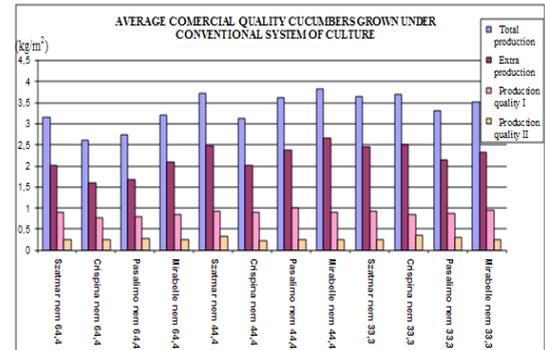


Figure 3. Average commercial quality of Husasău de Tinca 2007 – 2009 cucumbers in mulched versions

As for the organic cropping, all experimental versions were mulched with black foil as the unmulched versions gave insignificant results because of weed.

Cucumber fruit quality analysis in the three experimental years in all studied hybrids for organic cropping confirms once again the higher quality of fruit in versions planted at a density of 44.4 k plants/ha. That gave the highest percentage of extra quality fruit out of the total production and it also shows that all extra quality versions gave the largest amounts, followed by 1st quality with close average values.

In all versions, 2nd quality was not an important segment of production however it shows a slight difference between the versions with a density of 44.4 k plants/ha and the ones with 64.4 k plants/ha.

The analysis of the commercial quality of cucumber fruit as shown in Figure 4 and Table 1, obtained in organic farming in the three experimental years shows that the highest total production was recorded in the versions with a density of 44.4 k plants/ha and among hybrids. Szatmar and Mirabelle gave an average total production of 4.87 kg/m², 4.84 kg/m² respectively, of which 3.75 kg/m² respectively 3.77 kg/m² extra quality fruit, that is an average percentage of 77.00% respectively 77.89%, followed by the hybrid Mirabelle with a density of 33.3 k plants/ha and an average total production of 4.72 kg/m² and 76.69% extra quality fruit out of the total.

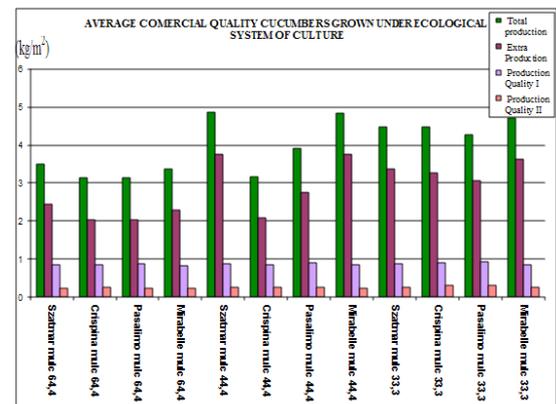


Figure 4. Average commercial quality of cucumber grown in polyethylene tunnels in ecological system

The lowest average percentage of extra quality fruit out of the total came from the hybrids Crispina and Pasalimo, with a density of 64.4 k plants/ha (64.85%).

DISCUSSIONS

The analysis of the factors that influenced the commercial quality of cornichon cucumbers, namely the farming system, mulched with black polyethylene foil, density of plants (64.4 k plants/ha, 44.4 k plants/ha and 33.3 k plants/ha) and hybrids (Szatmar, Crispina, Pasalimo, and Mirabelle) in both organic and traditional cropping systems, revealed the following conclusions:

Analysis of the dynamics of cucumber crops grown in traditional farming system in the three experimental years shows that harvesting began in the 2nd decade of July for the mulched versions and except for the Crispina hybrid which was harvested starting with the third decade of July like the unmulched versions. The highest production amount on quality levels was harvested in all versions in August and September and the hybrids Mirabelle and Szatmar stand out, the production dynamics being better at the density of 44.4 k plants/ha.

The analyzed hybrids gave different crops. In all the three experimental years, in the traditional cropping system, the one hybrid with the highest summer and total production on quality levels was Mirabelle, followed by Szatmar, significantly different by the witness hybrid Crispina.

In the organic cropping system, the hybrids gave comparable yields, but lower compared to the plants cropped traditionally.

The yields were differentiated according to the hybrid and plant density in all the three experimental years. The highest summer productions were recorded in all four hybrids with a density of 44.4 k plants/ha, followed by the density of 33.3 k plants/ha and the lowest yields were recorded in the density of 64.4 k plants/ha. The hybrid with the highest summer yield was Mirabelle, significantly different from the witness, followed by the hybrid Szatmar for a density of 64.4 and 44.4 k plants/ha, with a distinctly significant difference from the witness.

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