RESEARCH ON THE INFLUENCE OF THE CULTIVAR, DENSITY OF PLANTS AND CROP SYSTEM ON THE GROWTH AND FRUCTIFICATION OF EGGPLANT PLANTS

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Abstact

The general objective was to establish technological elements that would improve the quantitative and qualitative parameters, as well as the possibilities of cultivating eggplants in the ecological system, compared to the conventional crop system.

The general objective was a study on the influence of plant density on plant growth in some eggplant crops. The aim was to observe the plant's growth at 7 varieties of eggplants grown in different systems, using three variants of density made by ensuring different distances between plants in a row.

Key words: eggplant, variety, conventional system, ecological system

INTRODUCTION

A balanced diet involves the daily use of both animal and plant foods, which provide, in balanced proportions, nutritional factors: carbohydrates, proteins, lipids, mineral salts, water and vitamins (Indrea, et al., 2009) .

Eggplants are among the 35 cultivated plants, considered to be very important for global food security, being included in Annex 1 of the International Treaty on Plant Genetic Resources for Food and Agriculture (Fowler et al., 2003, cited by Plazas et al., 2019).

Eggplants are annual plants in temperate climates, autogamous, developed in the form of a woody shrub up to 1 m tall and 0.4-0.7 m in diameter. Under the conditions of a warm climate, without frost in winter, it behaves like a perennial species, developing a woody shrub at the base, with a height of about 1.5 m and a diameter of 1-1.2 m (Apahidean and Apahidean, 2000, Post, 2008).

Compared to the environmental conditions, eggplants are the most demanding plants, from the group of solano-fruit trees. Coming from a tropical area, with a monsoon climate (warm, with low oscillations from day to night, humid) eggplants have the highest requirements compared to natural factors and the field culture does not exceed the latitude of 48-50 °C (Indrea et al., 2012).

It is recommended to eat eggplant for people with rheumatic, renal, hepatic or diabetes, as they have anti-inflammatory, diuretic and hematopoietic properties.

MATERIAL AND METHOD

The research took place in 2021, in an ecological micro-farm and a garden of adjacent vegetables, in a conventional system, in Husasău de Tinca, a village located in the NW of the country.

The experiment was trifactorial with the following experimental factors:

- Factor A, the cultivar with 7 graduations: a1- Zaraza, a2- Violetta di Firenze, a3- Black Beauty, a4- Japanese Pickling, a5- Dourga, a6 - Monstrueuse de New York, a7- Listada Da Gandia;
- Factor B, plant density, with 3 graduations: b1-34,6 thousand plants/ha, b2-45,5 thousand plants/ha, b3- 60,6 thousand plants/ha.
- Factor C, crop system, with 2 graduations: c1- conventional system, c2- ecological system.

By combining the experimental factors resulted 42 experimental variants, which were placed in two rows on a 1.20 m wide foil, with a distance between rows on the foil of 0.70 m and between plants in a row of 0.50 m; 0.40 m and 0.30 m, for realizing the three densities established by the experimental protocol. The experimental variants were placed in three repetitions, the surface of a variant plot being 3.0 square meters (380 m^2/experience).

RESULTS AND DISCUSSION

The experiences were set up in early May. The first aspect analyzed was plant growth.

The height of the plants was influenced by the cultivator used, the number of plants / ha as well as the cultivation system practiced (table 1).

The height of the plants in the conventional cultivation system was between 41.03 cm for the New York Monstrueuse variety at a density of 45.5 thousand plants / ha and 56.87 cm for the Violetta di Firenze variety, at a density of 60.6 thousand plants /ha.

In the organic crop system, the plant height was between 34.59 cm at Monstrueuse in New York, at a density of 34.6 thousand plants / ha and 56.02 cm at Violetta di Firenze, at a density of 60.6 thousand plants /ha.

In both conventional and ecological systems, the plants recorded the lowest heights in the Monstrueuse de New York variety and the highest in the Violetta di Firenze variety, regardless of the density of the plants per hectare.

Table 1

The height of the plants in some varieties of eggplant cultivated at the different densities

Alternative		Plant height (cm)		
Variety	Density thousands of plants/ha	Conventional system	Ecological system	Difference
Zaraza	34.6	50.01	47.19	2.82
	45.5	52.33	46.32	6.01
	60.6	48.28	47.01	1.27
Violetta di Firenze	34.6	55.93	55.59	0.34
	45.5	53.05	51.11	1.94
	60.6	56.87	56.02	0.85
Black Beauty	34.6	45.06	43.25	1.81
	45.5	42.02	38.13	3.89
	60.6	50.89	49.91	0.98
Japanese Pickling	34.6	49.98	47.67	2.31
	45.5	43.78	43.34	0.44
	60.6	49.53	49.24	0.29
Dourga	34.6	42.92	41.18	1.74
	45.5	47.02	43.85	3.17
	60.6	47.44	47.28	0.16
Monstrueuse de New York	34.6	41.99	34.59	7.40
	45.5	41.03	37.16	3.87
	60.6	42.97	40.78	2.19
Listada Da Gandia	34.6	42.86	37.14	5.72
	45.5	46.04	44.54	1.50
	60.6	49.34	47.95	1.39

The difference in height for the eggplant varieties grown in the two cropping systems ranged from 0.16 cm to 7.40 cm. The largest differences in height were recorded in the New York Monstrueuse varieties 7.40 cm, at a density of 34.6 thousand plants / ha followed by the Zaraza variety with 6.01 cm at a density of 45.5 thousand plants /ha.

The average number of leaves per plant was influenced by the cultivar used, the number of plants / ha and the crop system practiced. (table 2).

Table 2

The medium number of leaves/plant in some cultivated eggplant varieties at different densities

Alternative		The medium number of leaves/plant		
Variety	density thousands of plants/ha	Conventional system	Ecological system	Difference
Zaraza	34.6	21.25	18.75	2.50
	45.5	19.50	17.25	2.25
	60.6	16.00	15.00	1.00
Violetta di Firenze	34.6	20.00	19.00	1.00
	45.5	18.50	15.75	2.75
	60.6	19.50	17.50	1.75
Black Beauty	34.6	20.00	19.25	0.75
	45.5	18.75	17.50	1.25
	60.6	18.25	17.00	1.25
Japanese Pickling	34.6	18.00	17.00	1.00
	45.5	17.75	16.25	1.50
	60.6	18.25	17.50	0.75
Dourga	34.6	20.75	18.00	2.75
	45.5	18.75	18.25	0.50
	60.6	20.25	19.25	1.00
Monstrueuse de New York	34.6	21.75	19.50	2.25
	45.5	20.00	17.50	2.50
	60.6	18.50	18.00	0.50
Listada Da Gandia	34.6	19.75	18.75	1.00
	45.5	19.25	18.50	0.75
	60.6	17.75	16.75	1.00

In the conventional crop system, the number of leaves / plant was between 16.00 pieces (Zaraza variety, with a density of 60.6 thousand plants / ha) and 21.75 pieces (Monstrueuse de New York variety, thickness of 34. 6 thousand plants / ha).

At a density of 34.6 thousand plants / ha, in the conventional system, the number of leaves / plant was between 18.00 (Japanese Pickling) and 21.75 pieces (Monstrueuse de New York). At a density of 45.5 thousand plants / ha, in the conventional crop system, the number of leaves / plant was between 17.75 pieces (Japanese Pickling) and 20.00 pieces (Monstrueuse de New York). At the maximum density, of 60.6 thousand plants / ha, the number of leaves / plant was between 16.00 pieces (Zaraza) and 20.25 pieces (Dourga).

In the organic crop system, the number of leaves per plant was between 15.00 pieces, (Zaraza density of 60.6 thousand plants / ha) and 19.50 pieces (Monstrueuse de New York, density of 34.6 thousand plants /Ha).

At a density of 34.6 thousand plants / ha, in the organic crop system,

the average number of leaves / plant was between 17.00 pieces (Japanese Pickling) and 19.50 pieces (Monstrueuse de New York). At a density of 45.5 thousand plants / ha, in the conventional crop system, the average number of leaves / plant was between 15.75 pieces (Violetta di Firenze) and 18.50 pieces (Listada Da Gandia). At the maximum density of 60.6 thousand plants / ha, the average number of leaves in plants grown in the organic system was between 15.00 pieces (Zaraza) and 19.25 pieces (Dourga).

The difference in the average number of leaves / plant in the eggplant varieties grown in the two cropping systems ranged from 0.50 to 2.75 pieces.

The average number of flowers per plant was influenced by the cultivar used, the number of plants / ha, as well as the cultivation system practiced (table 3).

Table 3

The degree of flowering of the plants in some varieties of eggplants grown in different densities

Alternative		Medium number of flowers+buds/plant		
Variety	Density thousands of plants/ha	Conventional system	Ecological system	Difference
Zaraza	34.6	7.00	6.00	1.00
	45.5	6.75	6.25	0.50
	60.6	7.25	6.00	1.25
Violetta di Firenze	34.6	7.25	6.75	0.50
	45.5	6.25	5.75	0.50
	60.6	5.50	5.25	0.25
Black Beauty	34.6	6.50	5.25	1.25
	45.5	6.25	5.75	0.50
	60.6	4.75	3.75	1.00
Japanese Pickling	34.6	7.75	7.25	0.75
	45.5	7.25	6.50	0.75
	60.6	7.25	5.25	2.00
Dourga	34.6	6.75	5.50	1.25
	45.5	6.00	5.50	0.50
	60.6	6.00	5.50	0.50
Monstrueuse de New York	34.6	6.25	5.75	0.50
	45.5	6.00	5.50	0.50
	60.6	5.75	4.75	1.00
Listada Da Gandia	34.6	5.75	5.50	0.25
	45.5	5.25	4.75	0.50
	60.6	6.75	5.00	1.25

In the conventional crop system, the number of flowers / plant, in the first decade of July, was between 4.75 pieces and 7.75 pieces.

At a density of 34.6 thousand plants / ha, in the conventional system, the number of flowers / plant was between 5.75 (Da Gandia List) and 7.75 pieces (Japanese Pickling). At a density of 45.5 thousand plants / ha, in the

conventional crop system, the number of flowers / plant was between 5.25 pieces (Da Gandia List) and 7.25 pieces (Japanese Pickling). At the maximum density, of 60.6 thousand plants / ha, the number of flowers / plant was between 4.75 pieces (Black Beauty) and 7.25 pieces (Japanese Pickling and Zaraza).

In the organic crop system, the number of flowers per plant was between 3.75 pieces and 7.25 pieces.

At a density of 34.6 thousand plants / ha, in the ecological crop system, the average number of flowers / plant was between 5.25 pieces (Black Beauty) and 7.25 pieces (Japanese Pickling). At a density of 45.5 thousand plants / ha, in the ecological crop system, the average number of flowers / plant was between 4.75 pieces (Listada Da Gandia) and 6.50 pieces (Japanese Pickling). At the maximum density of 60.6 thousand plants / ha, the average number of flowers in plants grown in the organic crop system was between 3.75 pieces (Black Beauty) and 6.00 pieces (Zaraza).

The difference in the average number of flowers / plant in eggplant varieties grown in the two cropping systems ranged from 0.25 to 2.00 pieces.

Table 4

The fruiting of the plants in some varieties of eggplants grown in different densities

Alternative		Medium number of fruit/plant		
Variety	Density thousands of plants/ha	Conventional system	Ecological system	Difference
Zaraza	34.6	5.25	4.50	0.75
	45.5	5.00	4.25	0.75
	60.6	5.25	4.25	1.00
Violetta di Firenze	34.6	4.50	3.75	0.75
	45.5	4.00	3.75	0.25
	60.6	4.25	4.00	0.25
Black Beauty	34.6	4.75	3.75	1.00
	45.5	5.25	4.25	1.00
	60.6	5.25	4.00	1.25
Japanese Pickling	34.6	6.50	5.25	1.25
	45.5	6.75	5.75	1.00
	60.6	6.50	5.50	1.00
Dourga	34.6	4.50	4.00	0.50
	45.5	4.25	3.50	0.75
	60.6	3.50	3.00	0.50
Monstrueuse de New York	34.6	4.00	3.50	0.50
	45.5	3.50	3.25	0.25
	60.6	3.50	3.25	0.25
Listada Da Gandia	34.6	4.25	4.00	0.25
	45.5	4.00	3.50	0.50
	60.6	3.25	2.50	0.75

The average number of fruits per plant was influenced by the cultivar

used, the number of plants / ha as well as the crop system practiced (table 4).

In the conventional crop system, the number of fruits / plant was between 3.25 pieces and 6.75 pieces.

At a density of 34.6 thousand plants / ha, in the conventional system, the number of fruits / plant was between 4.00 (New York Monstrueuse) and 6.50 pieces (Japanese Pickling). At a density of 45.5 thousand plants / ha, in the conventional crop system, the number of fruits/plant was between 3.50 pieces (Monstrueuse de New York) and 6.75 pieces (Japanese Pickling). At the maximum density, of 60.6 thousand plants / ha, the number of fruits / plant was between 3.25 pieces (Listada Da Gandia) and 6.50 pieces (Japanese Pickling).

In the organic farming system, the number of fruits per plant ranged from 2.50 pieces to 5.75 pieces.

At a density of 34.6 thousand plants / ha, in the organic crop system, the average number of fruits / plant was between 3.50 pieces (Monstrueuse de New York) and 5.25 pieces (Japanese Pickling). At a density of 45.5 thousand plants / ha, in the conventional crop system, the average number of fruits / plant was between 3.25 pieces (Monstrueuse de New York) and 5.75 pieces (Japanese Pickling). At the maximum density of 60.6 thousand plants / ha, the average number of fruits of plants grown in the organic system was between 2.50 pieces (Da Gandia List) and 5.50 pieces (Japanese Pickling).

The difference in the average number of fruit / plant in the eggplant varieties grown in the two cropping systems was between 0.25 and 1.25 pieces, in favor of the conventional cropping system.

CONCLUSIONS

1. Plant height, number of leaves per plant, number of flowers per plant, and number of fruits per plant are influenced by the cultivar used, the number of plants / ha and the cultivation system practiced.
2. Eggplants grown in the field, in an ecological system, had a smaller size compared to plants grown in the conventional system.
3. The highest heights were recorded in the Violetta di Firenze variety, both conventionally and ecologically, regardless of plant density per hectare.
4. Eggplants grown in the field, in an ecological system, had a lower average number of leaves per plant compared to plants grown in the conventional system.
5. In the conventional cultivation system, the Japanese Pickling variety had the highest number of flowers / plant.
6. In the ecological culture system, the highest number of flowers / plant was registered for the Japanese Pickling variety at a density of 34.6

thousand plants / ha and 45.5 thousand plants / ha and the Zaraza variety at a density of 60.6 thousand plants / ha .

7. The average number of fruits per plant was the highest in the Japanese Pickling variety, both in the conventional system and in the ecological system, regardless of the density of plants per hectare.
8. The difference in the average number of fruits / plants in the eggplant varieties grown in the two cropping systems was between 0.25 to 1.25 pieces, in favor of the conventional cropping system.

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