Behavior of some Eggplant Varieties in the Vidra Area - Ilfov

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Abstract

The main purpose of the experiences organized at Research and Development Institute for Vegetable and Flower Growing Vidra was to evaluate the behavior of different cultivars of eggplants in specific soil and climate conditions of the Vidra area and to identify those with high yields, with quality fruits and tolerant to soil borne pathogens attack. In 2016, 12 cultivars of eggplants were studied: 6 non-hybrid varieties (Daniela, Luiza, Dragaica, Zaraza, Belona, Black Beauty) and 6 hybrids (Andra F1, Rebeca F1, Bibo F1, Clorinda F1, Mirabelle F1, Epic F1). The highest yield was achieved in Rebeca F1 and Luiza cultivars. The highest vitamin C content was realized at Rebeca F1, Luiza, and Zaraza cultivars. The Mirabelle F1 hybrid and Black Beauty variety presented a reduced sensitivity to *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae*.

Keywords: eggplants, fruit quality, yield

Introduction

Eggplants (*Solanum melongena* L.), one of the main vegetable species cultivated in Romania, is grown on an area exceeding 8000 hectares, with a total yield of 132 thousand tonnes in 2016 (FAO, 2016). Eggplant fruit, although having a lower nutritional value compared to other vegetable species, are highly appreciated due to taste and content in anthocyanins, carotene, vitamin C, vitamin PP, aspartic acid, malic acid, pectic substances etc. According to data provided by the US Department of Agriculture on the nutrient content of fresh vegetables, eggplants have an energy value of 104 KJ (25 Kcal) / 100 g of fresh product. Fruits have a low carbohydrate content

(5.88 g), sugar (3.53 g), fiber (3 g), fat (0.18 g) and protein (0.98 g) (USDA, 2016). For consumption, there are preferred eggplants varieties which are productive, tolerant to the attack of soil borne pathogens and with high dry matter content. San José et al. (2014) observed that the growing condition plays a major role in determining the composition of eggplant fruit. Environmental and genotypic differences can be exploited to obtain high quality eggplant fruits. According to Bletsos et al. (1999) the yield and quality of eggplant fruit are determined, among others, by cultivation form, organic and mineral fertilization, soil moisture content and pathogen infection rates.

Table 1. The main characteristics of eggplants cultivars (Vidra, 2016)

Variety/hybrid	Fruit shape	Average weight of fruit (g)	Yield (t/ha)	Relative yield versus average (%)	Frequency of attacked plants (%)	
					<i>Verticillium dahliae</i>	<i>Fusarium oxysporum</i> f. sp. <i>melongenae</i>
Daniela	pear shaped elongated	380	47.0	108.6	25.0	13.3
Luiza	ovoid elongated	305	50.6**	115.6	36.3	9.0
Drăgaica	cylindrical easily pear shaped	270	48.1*	111.2	11.7	20.0
Zaraza	piriform	260	43.0	99.4	19.0	11.1
Black Beauty	oval elongated	350	33.3 ^{ooo}	76.9	14.2	12.6
Belona	pear shaped elongated	250	34.9 ^{ooo}	80.6	14.0	20.3
Andra	ovoid elongated	265	43.6	100.8	16.9	30.5
F ₁ Clorinda F ₁	oval	500	42.7	98.7	41.5	21.5
Rebeca F ₁	cylindrical	560	51.0***	147.9	46.4	17.8
Epic F ₁	oval	370	44.0	101.7	44.6	26.9
Mirabelle F ₁	oval elongated	320	42.6	98.4	8.7	7.0
Bibo F ₁	tears	290	38.2°	88.32	15.8	26.9
Average experience	-	343.3	43.25	100.0	-	-

LSD_{5%} = 4.27 ; LSD_{1%} = 5.79; LSD_{0.1%} = 7.76; *LSD - Least significant difference for comparison of yield

Table 2. Climatic data in the field (Vidra 2016)

Month	Temperature (°C)			Atmospheric humidity (%)			The precipitations amount (mm)
	average	minimum	maximum	average	minimum	maximum	
June	2.9	16.1	28.4	71.3	56.8	89.5	33.5
July	23.7	17.0	31.0	59.7	48.1	78.3	2.0
August	23.4	17.5	30.6	60.6	49.5	77.2	110.0
September	18.9	13.1	26.3	62.8	5.9	80.2	43.5
October	12.3	6.9	13.8	78.7	71.2	87.1	85.0

Materials and methods

The main purpose of the experiences organized at Research and Development Institute for Vegetable and Flower Growing Vidra was to evaluate the behavior of cultivars of eggplants in specific soil and climate conditions of the Vidra area. In 2016, 12 cultivars of eggplants were studied: 6 non-hybrid varieties (Daniela, Luiza, Dragaica, Zaraza, Belona, and Black Beauty) and 6 hybrids (Andra F₁, Rebeca F₁, Bibo F₁, Clorinda F₁, Mirabelle F₁, Epic F₁). The experience was places in randomized blocks, in 3 replicates. During the vegetation period observations were made on plant vigor, shape and weight of fruits as well as on the behavior of the varieties to the attack of soil borne pathogens *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae*. Once the fruit reached commercial maturity the following

determination of quality were carried out: total dry matter (gravimetric method), vitamin C (iodometric method), soluble solids content (refractometric method), total carbohydrates (Fehling Soxhlet method) and titratable acidity (titrimetric method). The production data were statistically processed by the analysis of variance (ANOVA), while the level of significance of the production differences was interpreted with Fisher test (Ciulca S, 2002).

Results and discussion

Regarding the yield, most of the cultivars exceeded 40 t/ha, with the highest yield on Rebeca F₁ hybrid (51.0 t/ha) and Luiza variety (50.6 t/ha). Rebeca F₁ and Clorinda F₁ hybrids were remarked by the fruit weight (560 g and 500 g respectively).

Table 3. Biochemical composition of fruits in different cultivars of eggplants (Vidra, 2016)

No.	Variety/hybrid	Water content (%)	Total dry matter (%)	Soluble dry matter (%)	Acidity (g)	Carbohydrate (%)	Vitamin C (mg)
1	Rebeca F1	91.01	8.99	4.7	0.32	3.90	9.68
2	Zaraza	91.59	8.41	3.5	0.30	2.96	7.47
3	Luiza	92.09	7.91	3.3	0.41	2.74	8.80
4	Drăgaica	92.59	7.41	3.6	0.30	3.00	7.04
5	Daniela	91.90	8.10	3.3	0.32	2.70	5.28
6	Clorinda	93.84	6.16	3.1	0.23	2.60	3.52
7	Epic F1	93.42	6.58	3.6	0.36	3.00	5.28
8	Andra F1	90.67	9.33	4.0	0.41	3.35	3.52
9	Mirabelle F1	91.18	8.82	3.7	0.39	3.07	5.28
10	Black Beauty	92.38	7.62	3.9	0.28	3.20	7.04
11	Belona	91.94	8.06	3.5	0.32	2.91	3.52
12	Bibo F1	93.56	6.44	3.5	0.32	2.90	5.28
Media varieties		92.18	7.82	3.64	0.33	3.03	5.98
Limits in the literature		90-93	7-10	5	0.23	0.7 - 5.4	5

The Black Beauty and Belona varieties exhibited the lowest yield with significantly negative differences compared to the average of the experiment. Differences have been observed regarding the behavior of the cultivars studied to pathogens attack. The *Verticillium dahliae* attack was the lowest in the following genotypes: Mirabelle F1, Belona and Black Beauty, and the highest attack was registered with Rebeca F1, Epic F1 and Luiza. Attack of *Fusarium oxysporum* f. sp. *melongenae* was the lowest in Mirabelle F1, Luiza, Zaraza and Black Beauty genotypes and more intense in Andra F1, Bibo F1, Epic F1 and Clorinda F1 (Table 1). Black Beauty variety and the Mirabelle F1 hybrid have been shown a low sensitivity to the attack of soil borne pathogens *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae*.

In the climatic conditions of 2016 (table 2) in the experimental fields of the Research Institute for Vegetable and Flower crop – Vidra, Ilfov district, eggplants have accumulated a total dry matter content of 6.16% for the Clorinda F1 cultivar and 9.33% for the cultivar Andra F1, average of cultivars being 7.82%. With a higher content than the average of cultivars, were: Rebeca F1, Zaraza, Daniela, Andra F1, Mirabelle F1, Luiza and Belona. The soluble dry matter substance showed values below the average in the literature, ranging from 3.1% at Clorinda F1 and 4.7% at Rebeca F1, with an average cultivares of 3.64%. Fruit acidity was

reduced to less than 0.5 g of malic acid per 100 g of fresh substance. The amount of fruit carbohydrate was between 2.60% for the Clorinda F1 cultivar and 3.90% for the Rebeca F1 cultivar, with an average of 3.03%. The vitamin C content of eggplants fruits was very variable depending on the cultivar studied. The best results were obtained with the following cultivars: Zaraza (7.47 mg), Luiza (8.80 mg) and Rebeca F1 (9.68 mg) with an average crop of 5.98 mg, and the average of literature is 5 mg (table 3).

Conclusion

Fruit weight varied between 250 g (Belona) and 560 g (Rebeca F1), depending on the cultivar. The yield ranged from 33.3 t/ha (Zaraza) and 51 t/ha (Rebeca F1). The Luiza variety also had a high yield (50.6 t/ha). As for the quality of the fruits, in the year 2016, the best results were obtained in the hybrid Rebeca F1 and Luiza variety. The Mirabelle F1 hybrid and the Black Beauty variety were less sensible to the attack of soil borne pathogens *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae*.

References

1. Bletsos F. A., Thanassouloupoulos C. C., Roupakias D.G., 1999. Water stress and verticillium wilt severity on eggplant (*Solanum melongena* L.). J. Phytopathol. 147 (4): 243-248.
2. Ciulca S (2002). Tehnică experimentală. Editura Mirton. Timișoara.

3. Food and Agriculture Organization of the United Nation. Food and agricultural data (2016). <http://www.fao.org/faostat/en/#data/QC>. Accessed 13.08.16;
4. San José, R., Sánchez-Mata, M.-C., Cámara, M. and Prohens, J. (2014), Eggplant fruit composition as affected by the cultivation environment and genetic constitution. *J. Sci. Food Agric.*, 94: 2774–2784. doi:10.1002/jsfa.6623
5. United States Department of Agriculture. USDA Food Composition Data bases (2016). <https://ndb.nal.usda.gov/ndb/foods/show/2962?manu=&fgcd=&ds>. Accessed 15.07.16.