

RESEARCH CONCERNING THE BEHAVIOUR OF SOME EGGPLANT (*SOLANUM MELONGENA* L.) GENOTYPES IN VIDRA, ILFOV REGION

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Abstract

Researches undertaken were aimed to verify the behavior of some varieties and hybrids of eggplant in conditions of soil and climate of the Vidra area. The cultivars were studying in terms of earliness, yield and resistance of the attack of soil born pathogens. There have been studied 12 genotypes of eggplant: 6 varieties and 6 hybrids. The cultivars Epic F1 and Daniela were the earliest and the variety Black Beauty and the F1 hybrid Mirabelle the latest. Average fruit weight ranged from 250 g (Belona) and 560 g (Rebeca F1). The yield ranged from 38.2 t/ha (Bibo F1) and 51.0 t/ha (Rebeca F1). Attack of soil born pathogens *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae* started since the 1 decade of September. *Verticillium dahliae* attack was the lowest in cultivars: Belona, Black Beauty and Mirabelle F1 and the high attack was recorded on Luiza, Rebeca F1 and Epic F1.

Keywords: resistance, *Solanum melongena* L., soil borne pathogens, varieties.

1. INTRODUCTION

The eggplants (*Solanum melongena* L.), one of the most widespread vegetables in Romania, are grown on approximately 9209 hectares (FAO, 2016). Eggplant fruits, although having a lower nutritional value compared to other vegetable species, are highly appreciated both by taste and biochemical components such as anthocyanins, carotene, vitamin C, malic acid, pectic substances etc. During the growing season, eggplant are attacked by soil-borne fungal pathogens including *Verticillium* spp. and *Fusarium* sp. Environmental, biotic and abiotic factors provide optimum conditions for many pathogen species that cause large production losses. According to Cristea et al. (2000) knowing the influence of abiotic factors on the growth and development of plant pathogens it is important study their biology. *Fusarium oxysporum* f.sp. *melongenae*, *Verticillium dahliae* are very destructive in eggplants crops and one of the most limiting factors to farmer's income (Bletsos et al., 2003). Soil-borne pathogens such as *Verticillium dahliae* and *Fusarium oxysporum* f.sp. *melongenae* may cause yield losses that exceed 60% in affected production areas (Bletsos et al., 2003). The first symptoms of wilting occur in the plant fructification phase. Plants attacked long before the end of the vegetation cycle (Docea et al., 2012). *Verticillium* wilt, caused by the

phytopathogen *Verticillium dahliae*, is particularly hard to eradicate and manage because the survival structures produced by the wilt pathogen remain viable in soil for more than two decades, persistently threatening crops (Fradin and Thomma, 2006; Klosterman et al., 2009).

Fusarium wilt of eggplant caused by *Fusarium oxysporum* f. sp. *melongenae* is an economically important soil borne disease limiting eggplant production worldwide (Dong et al., 2017). According to Altinok (2005) the soil-borne fungus invades the vascular bundles, causes severe wilting and death of the above ground parts of plants by blocking the xylem transport system. It is extremely difficult to control soil-borne fungi using conventional method such as the use of synthetic fungicides. Since their spores are able to survive for many years in the soil, biological control strategies for this pathogen should, therefore, be carefully selected and handled in an eco-friendly way instead of using chemical fungicides (Altinok et al., 2013).

2. MATERIALS AND METHODS

The main purpose of the experience was to study the behavior of some varieties and hybrids of eggplant to the soil and climatic conditions in Vidra area, in order to increasing yield and fruit quality. We studied the comporment of some cultivars and hybrids regarding the earliness, yielding and the behavior to the attack of soil borne pathogens. The experience was organized in 2016 in open field at RDIVFG Vidra. There were studied 12 cultivars (6 varieties and 6 hybrids): Daniela (figure 1), Luiza (figure 2), Drăgaica (figure 3), Zaraza (figure 4), Belona (figure 5), Black Beauty (figure 6), Andra F1 (figure 7), Rebeca F1 (figure 8), Bibo F1 (figure 9), Clorinda F1 (figure 10), Mirabelle F1 (figure 11), Epic F1 (figure 12).



Figure 1. Daniela



Figure 2. Luiza



Figure 3. Drăgaica



Figure 4. Zaraza



Figure 5. Belona



Figure 6. Black Beauty



Figure 7. Andra F1



Figure 8. Rebeca F1



Figure 9. Bibo F1



Figure 10. Clorinda F1



Figure 11. Mirabelle F1



Figure 12. Epic F1

The experience was places in randomized blocks, in 3 replicates (7.5 sqm/replicate), 24 plants/replicate, arranged in two rows, distance between rows 70 cm and between plants 40 cm. During the vegetation has been made phonological observation regarding the beginning of flowering, the settings of fruits and the date of first harvesting. There made observations regarding

plant vigor, fruit shape, color and weight and observation regarding behavior of the plant to the attack of soil borne pathogens *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae*.

3. RESULTS AND DISCUSSIONS

In the climatic conditions of 2016 (table 1) in the experimental fields the plant vigor was medium-high. Depending on the variety, the average fruit weight varied between 260 g (Belona) and 590 g (Rebeca F1) (table 2).

Table 1. Climatic data in the field (Vidra 2016)

Month	Temperature ($^{\circ}$ 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

Table 2. Biometric observations of the hybrids and cultivars (Vidra, 2016)

Variety / Hybrid	Plant vigor	Fruit shape	Fruit color	Fruit weight (g) (authors description)	Fruit weight (g) (Vidra, 2016)
Daniela	big	pear shaped elongated	dark purple	300-500	380
Luiza	medium	ovoid elongated	dark purple-black glossy	250-300	305
Drăgaica	big	cylindrical easily pear shaped	very shiny dark purple	300	270
Zaraza	big	piriform	glossy dark purple	350	260
Black Beauty	medium	oval elongated	black	200-300	350
Belona	medium	pear shaped elongated	glossy white	250-300	260
Andra F ₁	medium	ovoid elongated	glossy dark purple	250-300	265
Clorinda F ₁	big	oval	shiny black	600-800	500
Rebeca F1	big	cylindrical	dark purple-black	1235	590
Epic F ₁	big	oval	black	350-400	370
Mirabelle F ₁	big	oval elongated	black	200-300	320
Bibo F ₁	big	tears	white	270	290

Regarding earliness there was found that Epic F1 hybrid and Daniela variety were the earliest and the Black Beauty variety and the Mirabelle F1 hybrid latest (table 2).

Table 3. The main phenological phases of varieties and hybrids, the degree of attack of soil borne pathogen and yield (Vidra, 2016)

Variety / Hybrid	Beginning of flowering	Date first harvest	The degree of attack (%), (DA %)		Yield (t/ha)	Relative yield versus average (%)
			<i>Verticillium dahliae</i>	<i>Fusarium oxysporum</i> f. sp. <i>melongenae</i>		
Daniela	10.07	12.08	8.45	13.0	47.07	108.66
Luiza	15.07	7.08	15.6	9.1	50.67**	116.98
Drăgaica	25.07	23.08	5.7	20.0	48.17*	111.20
Zaraza	22.07	23.08	8.6	11.1	43.00	99.28

Black Beauty	13.08	9.09	1.6	12.7	33.30^{ooo}	76.88
Belona	26.07	22.08	2.8	20.3	34.93^{ooo}	80.65
Andra F₁	23.07	22.08	8.1	30.5	43.63	100.74
Clorinda F₁	28.07	22.08	16.8	21.5	42.67	98.66
Rebeca F₁	27.07	22.08	24.5	14.3	51.00^{**}	117.75
Epic F₁	12.07	12.08	12.6	15.4	44.00	101.58
Mirabelle F₁	1.08	22.08	4.8	7.0	42.67	98.51
Bibo F₁	15.07	12.08	3.94	27	38.60^o	89.12
Experience averag	-	-	-	-	43.31	100.00

LSD 5% = 4.278; LSD 1% = 5.798; LSD 0.1% = 7.765

Analyzing the behavior of carrot cultivars, compared to the average of the experience, we can see that in 2016, at Vidra, the best results were obtained with the Luiza variety and Rebeca F₁ hybrid with a positive production (Table 3).

The Black Beauty and Belona varieties gave the worst results with a significantly negative production difference compared to the average of the experience (Table 3).

In the comparative crop with eggplant cultivars, the attack of the pathogens of *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *melongenae* appeared at the first decade of september. Regarding the behavior of the varieties and hybrids against the attack of soil pathogens, *Verticillium dahliae* attack was the lowest in the following cultivars: Black Beauty, Belona and Mirabelle F₁ (DA = 1.6-4.8%), and the highest attack was recorded at Epic F₁, Luiza and Rebeca F₁ (DA = 12.6 - 24.5%). Attack of *Fusarium oxysporum* f. sp. *melongenae* was the lowest in Mirabelle F₁, Luiza, Zaraza and Black Beauty (figure 13) cultivars (DA = 7.0 - 12.7%) and more intense at Epic F₁, Clorinda F₁, Bibo F₁ (figure 14) and Andra F₁ (DA = 15.4 - 30.5%)(table 2). Analyzing the behavior of the attack of soil borne pathogens *Verticillium dahliae* (figure 15) and *Fusarium oxysporum* f. sp. *melongenae*, it is found that the Belona, Black Beauty and Mirabelle F₁ cultivars are the most tolerant of the attack on both pathogens.



Figure 13. Attack of *Fusarium oxysporum* on Black Beauty variety(Vidra, 2016)



Figure 14. Attack of *Fusarium oxysporum* on Bibo F1 hibryd(Vidra, 2016)



Figure 15. Attack of *Verticillium dahliae*(Vidra, 2016)

4. CONCLUSIONS

In the climatic conditions of 2016 in the experimental crops the plant vigor was medium on Luiza, Black Beauty, Belona, Andra F1 and high on Daniela, Drăgaica, Zaraza, Clorinda F1, Rebeca F1, Epic F1, Mirabelle F1, Bibo F1. The fruit weight at the Luiza, Bibo F1 and Mirabelle F1 cultivars, there was a slight increase in weight compared to the authors' description. The Black Beauty variety and Mirabelle F1 hybrid are distinguished by a reduced sensitivity to the attacks of the two pathogens. Regarding the yield, the majority of cultivars exceeded 40 t / ha, with the highest values recorded at the Rebeca F1 hybrid (51.00 t / ha) and Luiza variety (50.67 t / ha).

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