SUITABILITY STUDY OF VEGETABLE CULTIVARS IN ORGANIC FARMING

STUDIUL PRETABILITĂȚII UNOR CULTIVARE DE LEGUME LA CULTURA ÎN AGRICULTURĂ ECOLOGICĂ

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***Abstract**: Tomato lines: L3, L4, L5, L6, L6 -7, LL1, LL2, LL3, LL4, LL5, LL7, LL8, LL9, LL10, LL11, LL12, LL13, LL14, LL15, LL16, LL17, LL19, LL20, LL21, LL22, LL23, LL24, LL25, LL27 and Benatar F1 hybrid had the highest suitability in organic farming system. Lines: L1, L2, LL6 and hybrids: F1 Abelus, Bersola F1, Amanet F1 were tolerant of soil pathogens attack. The proportion of healthy plants was 96%. Lines: LL18 and LL26 were susceptible to attack by soil diseases the % of healthy plants was under 78%. Degree of attack at varieties of lettuce: were less than 3% for Marilena and 0% at Silvia and Serata. The % of healthy plants at long pepper - Siret, sweet pepper - Dariana Bac and round pepper - Creola was higher than 95%.*
***Key words:** study, soil pathogens attack, tomato, pepper, organic agriculture*

***Rezumat:** Liniile de tomate: L3, L4, L5, L6, L6 -7, LL1, LL2, LL3, LL4, LL5, LL7, LL8, LL9, LL10, LL11, LL12, LL13, LL14, LL15, LL16, LL17, LL19, LL20, LL21, LL22, LL23, LL24, LL25, LL27 şi hibridul Benatar F1 au avut cea mai bună pretabilitate la sistemul de agricultură ecologică. Liniile: L1, L2, LL6 şi hibrizii: Abelus F1, Bersola F1, Amanet F1 au fost tolerante la atacul patogenilor de sol, procentul de plante sănătoase fiind de peste 96%. Liniile: LL18 şi LL26 au fost sensibile la atacul bolilor de sol, procentul de plante sănătoase fiind sub 78%. La soiurile de salată gradul de atac a fost sub 3% în cazul soiului Marilena şi 0% la soiurile Silvia şi Serata. La soiurile de ardei lung - Siret, ardei gras - Dariana Bac şi ardei gogoşar - Creola procentul de plante sănătoase a fost mai mare de 95%.*
***Cuvinte cheie:** studiul, atacul patogenilor de sol, tomate, ardei, agricultură ecologică*

INTRODUCTION

The major diseases of seedlings are: *Pythium debaryanum* (Hesse), *Rhizoctonia solani (*Kühn), *Fusarium* spp*., Peronospora destructor* (Berk.), (Goldberg, 1995).

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The best practice for minimizing the incidence of disease in organic vegetable crops is planting high quality disease-resistant cultivars (Hamilton, 2004).

All species of plants grown from seed are susceptible to one or more of the soil-borne fungi attack, capable to kill the seedlings (Ravishankar Rai and Mamatha 2004; Ravishankar Rai and Mamatha 2005).

The plants wilt and die suddenly, sometimes before emerging from the soil (preemergence damping-off) and sometimes after emerging from the soil (postemergence damping-off). Symptoms can include root rot, stem lesions, and general seedling wilt. This is even more important, because the tolerant species at pathogen attack have ability to grow in organic agriculture. The sensible species are not indicated for cultivation in organic agriculture.

MATERIAL AND METHOD

During 2010– 2012 years, greenhouse experiments were performed in Vegetable Research-Development Station Bacau - Romania, in order to evaluate the behaviour of vegetable species in the seedling stage, to the soil-borne diseases attack. We refer at the following species: tomato, pepper, lettuce, eggplant.

The seeds of species were sown in the greenhouse on March.

After to 6 – 15 days the young plants were transplanted in cell plastic trays. The soil was treated two times with a fermentation extract of *Urtica dioica*. No preventive chemicals treatments were applied in order to encourage the development of the natural diseases.

Ratings were based on Pathogenically Rating Scale 0-5 (0 is no disease, 5 is terminally infected). The plants were visually evaluated. The following scale was used:

1 - No spots and lesions,
2 - 1 - 3 spots or lesions present on stem or leaves,
3 - 4 - 8 spots present on stem, leaves and bracts,
4 - Lesions and spots present on stem, bracts, leaves, flowers and stems,
5 - Collapse of plant.

The observations were made every 10 days during a 30 days period after plantation of young vegetable plants in cell plastic trays.

The attack estimation was accomplished according with following indicators:

- Frequency of attack (F%),
- Intensity of attack (I%),
- Degree of attack (DA%).

The obtained results will be used in plant breeding activity in order to decrease the number of diseases treatments in the organic agriculture practices of plants with multiple uses.

RESULTS AND DISCUSSIONS

The results obtained in the study accomplished for the determination of the frequency and intensity of the attack of soil borne pathogens is shown in table 1. You can see that the data varied in high limits. The data obtained show that the tomato lines: L3, L4, L5, L6, L6 -7, LL1, LL2, LL3, LL4, LL5, LL7, LL8, LL9, LL10, LL11, LL12, LL13, LL14, LL15, LL16, LL17, LL19, LL20, LL21, LL22, LL23, LL24, LL25, LL27 and Benatar F1 hybrid had the best suitability to organic farming system.

Table 1

Vegetable species used for monitoring of pathogens attack

No.	Cultivar	Attack			H%	Comment
		F%	I%	DA%		
1	2	3	4	5	6	7
Tomatoes with indeterminate port						
V1	L1	1.8	100	1.8^{PPP}	98.2**	Normal emergence
V2	L2	1.8	100	1.8^{PPP}	98.2**	Normal emergence
V3	L3	0	0	0^{PPP}	100***	Normal emergence
V4	L4	0	0	0^{PPP}	100***	Normal emergence
V5	L5	0	0	0^{PPP}	100***	Normal emergence
V6	L6	0	0	0^{PPP}	100***	Normal emergence
V7	L6 -7	0	0	0^{PPP}	100***	Normal emergence
V8	LL1	0	0	0^{PPP}	100***	Normal emergence
V9	LL2	0	0	0^{PPP}	100***	Normal emergence
V10	LL3	0	0	0^{PPP}	100***	Normal emergence
V11	LL4	0	0	0^{PPP}	100***	Normal emergence
V12	LL5	0	0	0^{PPP}	100***	Normal emergence
V13	LL6 Mt	10.0	100	10.0^{PP}	90.0	Normal emergence
V14	LL7	0	0	0^{PPP}	100***	Normal emergence
V15	LL8	0	0	0^{PPP}	100***	Normal emergence
V16	LL9	0	0	0^{PPP}	100***	Normal emergence
V17	LL10	0	0	0^{PPP}	100***	Normal emergence
V18	LL11	0	0	0^{PPP}	100***	Normal emergence
V19	LL12	0	0	0^{PPP}	100***	Normal emergence
V20	LL13	0	0	0^{PPP}	100***	Normal emergence
V21	LL14	0	0	0^{PPP}	100***	Normal emergence
V22	LL15	0	0	0^{PPP}	100***	Normal emergence
V23	LL16	0	0	0^{PPP}	100***	Normal emergence
V24	LL17	0	0	0^{PPP}	100***	Normal emergence
V25	LL18	28.6	100	28.6^{P}	71.4^{000}	Normal emergence
V26	LL19	0	0	0^{PPP}	100***	Normal emergence
V27	LL20	0	0	0^{PPP}	100***	Normal emergence
V28	LL21	0	0	0^{PPP}	100***	Normal emergence
V29	LL22	0	0	0^{PPP}	100***	Normal emergence
V30	LL23	0	0	0^{PPP}	100***	Normal emergence
V31	LL24	0	0	0^{PPP}	100***	Normal emergence
V32	LL25	0	0	0^{PPP}	100***	Normal emergence
V33	LL26	22.2	100	22.2^{P}	77.8^{000}	Normal emergence
V34	LL27	0	0	0^{PPP}	100***	Normal emergence
V35	Abelus F1	3.2	100	3.2^{PPP}	96.8**	Normal emergence
V36	Bersola F1	1.4	100	1.4^{PPP}	98.6**	Normal emergence
V37	Benatar F1	0	0	0^{PPP}	100***	Normal emergence
V38	Amanet F1	2.7	100	2.7^{PPP}	97.3**	Normal emergence
Lettuce						
V39	Marilena	2.1	100	2.1^{PPP}	97.9**	Normal emergence
V40	Serata	0	0	0^{PPP}	100***	Normal emergence
V41	Silvia	0	0	0^{PPP}	100***	Normal emergence
Pepper						
V42	Long - Siret	4.2	100	4.2^{PPP}	95.8**	Normal emergence

1	2	3	4	5	6	7
V43	Round pepper – Creola	1.0	100	1.0 ^{PPP}	99.0**	Normal emergence
V44	Sweet pepper – Dariana Bac	3.2	100	3.2 ^{PPP}	96.8**	Normal emergence
V45	Eggplants Contesa	2.3	100	2.3 ^{PPP}	97.7**	Normal emergence

F% - frequency, I% - intensity, DA% - degree of attack (%),
H% - health plants (%).
*** very good ability for organic agriculture
** good ability for organic agriculture
* low ability to organic agriculture
Very good suitability for organic agriculture ^{PPP}
Good suitability for organic agriculture ^{PP}
Suitability reduced for organic agriculture ^{P}
DL 5% - 4,9
DL 1% - 6,8
DL 0,1% - 9,2

The soil pathogens attack after transfer in seedling container was absent. Lines L1, L2, LL6 and hybrids: Abelus F1, Bersola F1, Amanet F1 were tolerant to soil pathogen attack. The percentage of healthy plants is over 96%. Lines: LL18 and LL26 were susceptible to disease soil borne attack (Fig. 1). The percentage of healthy plants was under 78%. Plants do not have suitability for organic farming.

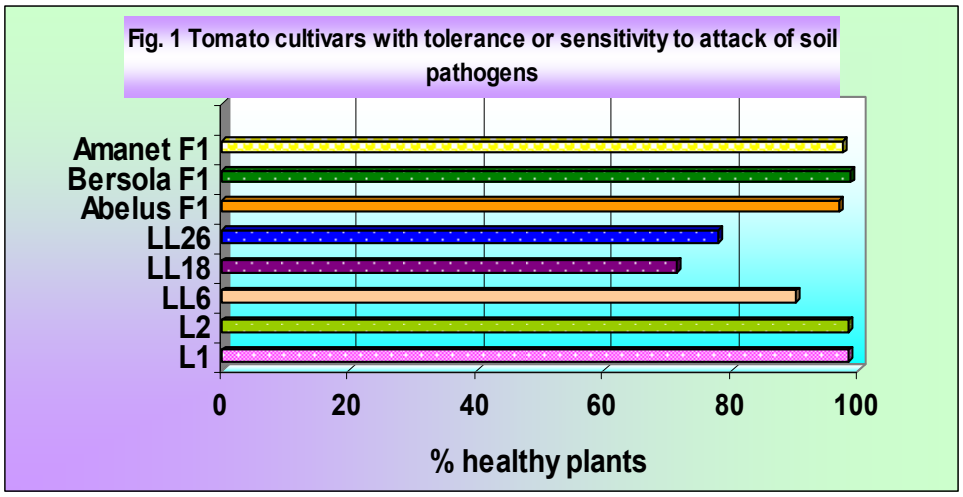
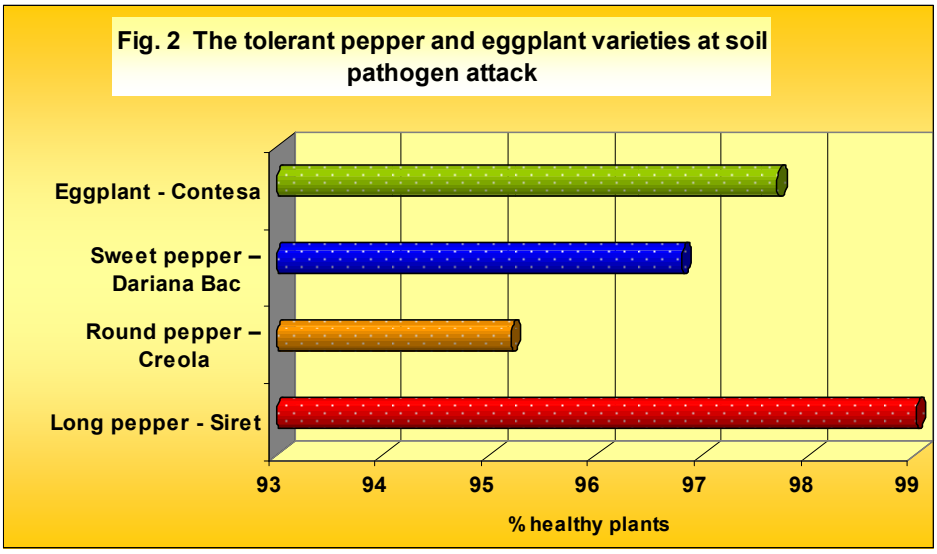


Fig. 1 Tomato cultivars with tolerance or sensitivity to attack of soil pathogens

Varieties of lettuce: Marilena, Serata and Silvia had very good suitability in seedling stage at the attack of soil borne diseases. The attack level was below 3% for Marilena and was absent at Serata and Silvia varieties.

Siret, long pepper variety, Dariana Bac, sweet pepper, Creola, round pepper and Contesa, eggplant were tolerant at soil pathogens attack fig. 2. The percent of healthy plants were higher than 95%.



CONCLUSIONS

The trials were performed during 2010 – 2012 at Vegetable Research and Development Station Bacau. The tomato lines: L3, L4, L5, L6, L6 -7, LL1, LL2, LL3, LL4, LL5, LL7, LL8, LL9, LL10, LL11, LL12, LL13, LL14, LL15, LL16, LL17, LL19, LL20, LL21, LL22, LL23, LL24, LL25, LL27 and Benatar F1 hybrid had the best suitability to organic farming system. The soil pathogens attack after transfer in seedling container was absent.

Lines L1, L2, LL6 and hybrids: Abelus F1, Bersola F1, Amanet F1 were tolerant of soil pathogen attack. The percentage of healthy plants is over 96%. Lines: LL18 and LL26 were susceptible to disease soil borne attack. The percentage of healthy plants was under 78%. Plants do not have suitability for organic farming. Varieties of lettuce: Marilena, Serata and Silvia had very good suitability in seedling stage at the attack of soil borne diseases. The attack level was below 3% for Marilena and was absent at Serata and Silvia varieties.

Siret - long pepper variety, Dariana Bac - sweet pepper, Creola - round pepper and Contesa - eggplant were tolerant at soil pathogens attack. The percent of healthy plants was higher than 95%.

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