

GENETIC VARIABILITY EXPRESSION OF SOME POTATO GENOTYPES FUNCTION BY CLIMATIC CONDITIONS

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Abstract: *The quantity features and quality ones, depend in the greatest extent on the genetic income of the partners, on the way that these characters have been transmitted in pedigree and the combination specific capacity.*

*Having into consideration that the meteorological conditions have been more favorable for the presence of the pathogen pressure that has been very increased, and also for the attenuation of the late blight of potato attack for the genotypes port for the modification of the tolerance grade of the leaves in comparison with the attack produced by the fungus *Phytophthora infestans*.*

Key words: *genetic variability, potato genotypes, climatic conditions*

Introduction

Although the tubers rated capacity depends on some factors, the role of the genotype in levels modification of the harvests is uncontestable, because the genetic structure depends in a great extent on its capacity attenuate the limitative effects of some vegetation conditions that are less favorable.

Having into consideration the area offered by the station, the climatic conditions are favorable for many diseases and skin suberization, the pests, knowing the contribution of the genotype to the attenuation of its limitative effects, represents a great preoccupation. Besides the mentioned aspects, there has been taken into consideration some quality features: the form of the tubers, the depth of the eyes, the skin suberization level, the color of the pulp, etc, as this confers a commercial quality and through this concurs to the economic increase of the production.

This work is part of a more vast research thematic, initiated with the purpose of creating new potato advanced cultivars, with an increased production capacity, with a increased to the pathogen agents and climatic stress, advanced cultivars that

have superior culinary qualities, that are suitable for industrialization. The quantity features and quality ones, depend in the greatest extent on the genetic income of the partners, on the way that these characters have been transmitted in pedigree and the combination specific capacity. In the same time it should be outlined that the data refers to the comparative orientation cultures level that allow the evaluation in a more advanced faze of the amelioration process, of the production potential and this way the estimation of the effects due to the variability and the selection process.

Biologic material and research method

In the following part there is represented the behavior in the comparative culture of some nine potato lines created at ARDS of Suceava through an intraspecific hybridization that have proved to be valorous concerning the resistance to diseases (viruses and late blight of potato) and with a greater production capacity. The experience has been placed in blocks with a randomized structure plots, in three replications, the planted surface of one plot being of 16,8 mp. The tubers have been planted manually at a distance of 30 cm on a row and 70 cm between the rows,

assuring a density of 47,6thousands of plants on a hectare.

As nurturing work there should be mentioned the chemical destruction of the annual weeds, that has been carried out with Dancor 1,2 l/ha. There have been done some treatments for the late blight of potato infection attenuation using Antracol 2kg/ha, Bravo 2kg/ha, Rannman 200 g/ha as contact fungicides and two treatments with systemic fungicides, using Secure 2kg/ha and Tadoo C 2 l/ha. In order to combat the carrying aphides of viruses and larva of the Colorado potato beetle, there have been done for treatments with

the following insecticides: Actara 0,06 Kg /ha and Calypso 0,09 kg/ha.

The fertilization has been carried out during the spring with 200 kg ammonium nitrate/ha (16:16:16), 500 kg on ha, reaching 150 kg of azoth, 80 kg P2O5 and 80 kg K 2o /ha. The soil type on which there has been placed the experience is leached chernozem. The interpretation of the results has been done through the variance analyses following the presented method by N. Ceapoiu. (1968).

Concerning the thermo regime there should be mentioned the following:

Table 1. Thermal regime (IV-IX 2008)

Month	Decade	Values	Multiannual average	Standard deviation
IV	1	7,3		
	2	10,3		
	3	6,9		
	Monthly	8,2	8,0	0,2
V	1	12,3		
	2	12,3		
	3	17,7		
	Monthly	14,1	13,7	0,4
VI	1	14,0		
	2	17,4		
	3	18,1		
	Monthly	16,5	17,1	-0,6
VII	1	17,4		
	2	18,6		
	3	22,4		
	Monthly	19,7	18,6	1,1
VIII	1	18,5		
	2	16,9		
	3	18,2		
	Monthly	17,9	17,9	0,0
IX	1	16,0		
	2	15,0		
	3	13,4		
	Monthly	14,8	13,6	1,2
Pluviometrical regime (IV-IX 2008)				
IV	1	0,0		
	2	44,1		
	3	56,5		
	Monthly	100,5	45,3	55,2
V	1	56,4		
	2	9,3		
	3	33,2		
	Monthly	98,9	72,4	26,5
VI	1	69,8		
	2	22,0		
	3	25,1		
	Monthly	116,9	91,4	25,5
VII	1	18,9		
	2	25,5		
	3	0,9		

	Monthly	45,3	88,7	-43,4
VIII	1	87,9		
	2	135,8		
	3	3,7		
	Monthly	227,4	68,0	159,4
IX	1	0,0		
	2	20,5		
	3	0,0		
	Monthly	20,5	45,2	-24,7
XI-III			122,8	

-the monthly averages have been close to the multiannual only in April and August.

-In July there has been registered a supplementary caloric contribution, due to the temperatures from the third decade, when its average was of 22,4 C, as a consequence of the monthly average was 1,1C bigger than the multiannual value.

-in comparison with the multiannual average, the coldest month has been June (0,6°C), and this is due to the coldness of the air from the first decade, of which average has been only of 14, 0C.

Results and discussions

Concerning the influence of the meteorological conditions on the main

levels of the potato vegetation there can be outlined some aspects. The big wet of the soil in May, and also its heating in the third decade of May (17,7 C) have favored the rapid increase of the tillers, making the flowering of the plants faster in the first days of may(17,7C) have favored quick breeding of the tillers, making the breeding of the plants faster in the first days of June. As a consequence the plants breeding has taken place after 26-32 days from the plantation (table 2). From the tested lines, the earliest has been noticed at 00-847-22, and also to 01-884-8, 00-847-5 and 99-789 -12(01.06) and the latest for the lines 00-847-25, 99-789-11, 99-789-10 and 01-884-2 (04-05.06).

Table 2 The vegetation period length

Line	The sprouting time	The vegetation period length (days)
Sv 01-884-4	2.06	94
Sv 01-884-8	1.06	87
Sv 01-884-2	5.06	92
Sv 00-847-5	1.06	91
Sv 00-847-22	30.05	87
Sv 00-847-25	4.06	86
Sv 99-789-11	4.06	91
Sv 99-789-12	1.06	95
Sv 99-789-10	4.06	88
Astral	3.06	89

The significant heating that has been registered beginning with the second decade of June, and also the pluviometrical regime favorable and not interrupted in June have favored the acceleration of the developing rhythm of the plants, and this way the partial recuperation of the negative influence generated by lasting of the plantation. Comparative with June, the

meteorological conditions from July and august have been very unfavorable for the reserve substance accumulation.

Concerning the vegetation period of the lines there should be appreciated that these frame themselves in the semi earlier genotypes group, being alike to the one of the Astral cultivar of 89 days, among these, the lines 00-847-25, 01-884-8,99-789-10,

there have been outlined through a shorter period (86-88 das) of the vegetation period of 7-8 days, comparative with the lines 01-8844 and 99-789-12 with its vegetation period of 94-95 days.

The notes done during the vegetation concerning the frequency of the infested bushes with easy viruses of the mosaics

type and the hard viruses(leaf rolling, streak mosaic), permit the outlining of the fact that the majority of the lines own a real resistance to the virotic degeneration (table 3). Among these, only the line 99-789-11 would represent (after the data subscribed in the second table) a notable sensitivity.

Table 3 The observations concerning the resistance to late blight of potato and viruses

Lines	The bushes frequency infected with viroses (total %)	The foliar tolerance at the late blight of potato attack (notes)*	
		18.07	4.08
Sv 01-884-4	6,0	8	8
Sv 01-884-8	12,9	7	7
Sv 01-884-2	2,5	6	6
Sv 00-847-5	5,6	8	8
Sv 00-847-22	4,2	7	7
Sv 00-847-25	0,5	9	9
Sv 99-789-11	27,3	8	8
Sv 99-789-12	8,0	9	8
Sv 99-789-10	3,2	8	7
Astral	13,4	9	9

*: 1- the very small tolerance
9- Very tolerant

Having into consideration that the meteorological conditions have been more favorable for the presence of the pathogen pressure that has been very increased, and also for the attenuation of the late blight of potato attack for the genotypes port for the modification of the tolerance grade of the leaves in comparison with the attack produced by the fungus

Phytophthora infestans.

Marking with five the very tolerant forms and with one the ones with a very low tolerance, it can be appreciated the line 00-847-25 has presented in the 2008 conditions the biggest tolerance of the leaves 1 for the asexual form of the late blight potato followed by the line 00-789-11. The lowest tolerance has been presented by the 01-884-2 line.

Concerning the total production of tubers, subscribed in the third table there can be outlined some aspects:

- in comparison with the decreasing average (241,1 t/ha) it deserves to be outlined only the 01-884-4 line, that has been attached with the total production of 28 t/ha; as the line 01-884-8 has registered an increase of 2,1 t/ha, it deserves to be retained at least a year for edification.

- if the comparison is reached out in comparison with the less productive line (99-789-10), there can be outlined the lines 01-884-4, 01-884-8, and 00-847-25, that can be outlined through significant increases.

The four criteria (among which two are identical in this case) of evaluation of the decreases can contribute to the increase of the selection pressure and through this to the increase of the random of the amelioration activity. In the same time they can contribute to the diminution of the elimination risk of a very valorous potential material.

Regarding the total production, beside the 01-884-4 lines that have been attached with the maximum production there are also the lines 01-884-8 and 00-847-25 for the next levels that represent a great interest.

Concerning the commercial production dimension (for alimentary use) there can be remarked in the first place the 01-884-8 line that has been attached with the biggest production of big tubers (over 100g). If there is taken into consideration the fact that although this line (01-884-8) has been over reached with 1,8 t for the total production for the line 01-884-4 and that

for the commercial production there is an overreach of 1,5 t/ha, there can be considered that the line 01-884-8 can produce big tubers and can outline herself in other vegetation conditions.

In order to reach the synthetic valuation, closely similar to the “agronomic index” used for maze, there have been given marks from one to five, as following:

1. very unsatisfactory
2. unsatisfactory
3. average
4. good
5. very good

Table 4 The synthetic valuation to the descendents

No.	Lines	The yield		Tolerance	
		total	commercial	To the late blight of potato	To viroses
1.	Sv 01-884-4	5	4	4	4
2.	Sv 01-884-8	4	5	4	1
3.	Sv 01-884-2	3	4	3	5
4.	Sv 00-847-5	1	1	4	4
5.	Sv 00-847-22	3	3	4	5
6.	Sv 00-847-25	4	3	5	5
7.	Sv 99-789-11	3	4	4	1
8.	Sv 99-789-12	3	2	4	4
9.	Sv 99-789-10	1	2	4	5

Conclusions

The data subscribed in the forth table allow the outlining of the line 01-884-4 that in the year 2008 has had very good and very good random of tubers and a good tolerance for late blight of potato and viruses.

The line 01-884-8 represents some notable qualities and can represent an interest for the areal with a virotic infestation that is much reduced, and the line 00-847-25

can be considered “valorous” for any other uses if the random of big tubers is improved through other cultural methods.

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