

THE COMPARATIVE STUDIES OF SOME POTATO CULTIVARS IN DIFFERENT PEDOCLIMATIC CONDITIONS FROM SUCEAVA COUNTY

D. BODEA¹, Gh. SAGHIN¹

¹ Research and Development Station of Suceava
e-mail: dumitru_bodea_x@yahoo.com.

The researches were conducted during period 2005-2007 in Suceava Plateau at Agricultural Research and Development Station of Suceava on a soil of Chernisols class, on faeoziom cambic type and subtype and in the mountains area of Suceava County at Agricultural Research Center of Pojorâta on lithic alluvial soil. In both locations it was taken in the study, a total of 24 varieties of potato, 23 Romanian and one Dutch. It was pursued the production potential of genotypes, number of tubers and the percentage of tubers on size categories, resistance to diseases and the growing season. Following the results obtained, it was found that in the environmental conditions of the Suceava Plateau the varieties Astral, Claudiu (semi earlier group), Loial, Sante, Speranta, Nicoleta and Robusta (semi later group) achieved the highest yields of tubers, ranging from 34, 6 t/ha and 38.2 t/ha, production increases from the average taken as control varieties being distinct and very significant amplitude between 3.6 t/ha and 5.3 t/ha.

In the environmental conditions of Bucovina Obcine, the largest production of tuber have made Astral, Claudiu. Loial, Robusta and Dragomirna, between 32.3 t/ha and 36.4 t/ha, the production increases in comparison with average of varieties yields being very significant.

Key words: advanced cultivar, yield capacity, resistance to diseases

The potato cultivars represent in the actual period one of the main factors which determine the yield increases in order to satisfy the consumer exigency for quality.

The experimentation importance and knowledge of many Romanian and foreign potato cultivars, through complex characterization of them after ecological crop area and economics criteria, determined the continuation of the researches in this domain.

Because of diversity of natural conditions from our country it is necessary to promote in crop production a big potato cultivars numbers, which from their traits complexity (precocity, productivity, and quality and diseases resistance) have to satisfy the economic requirement and to correspond to the higher prices of the potato farmers.

In the last time in our country were created and homologated over 39 potato cultivars, but unfortunately only few cultivars are promotes in the production process. In this context in order to increase of interest of the potato farmers from

the Suceava county, we shows the obtained results with potato cultivars studied in two different ecological area from Suceava county (Suceava and Pojorata).

MATERIAL AND METHOD

The researches were conducted during period 2005-2007 in Suceava Plateau at Agricultural Research and Development Station of Suceava on a soil of Chernisols class, on *faeoziom cambic* type and subtype, coming from a grasslands soil. Groundwater occurs at depths greater than 5 meters.

Physically, this type of soil is presented with a texture ranging from clay- sandy clay to medium clay (both surface and horizontal A / B). Fading factor: 11.0.

Agrochemical characterization of arable horizon: pH in water - 5.6 to 5.8, total N - 0.198%, humus content - 3 to 3.5, total phosphorus - 0.116%.

In the mountain area, at the Agricultural Research Center Pojorâta, Suceava County (altitude 700 m) on an alluvial lithic soil associated on the small surfaces with litosols, situated on the river terrace Moldova, clay-sandy texture, pH (water) = 5.9, mobile phosphorus 55.6 ppm, 82.4 ppm mobile potassium, humus content of 3.8% and nitrogen 4.79 index. The experiments were arranged as randomized blocks method in four replications. At harvesting time the total yield, the medium number of tubers and the percentage of tubers per size categories were determined. It was taken in study a total of 24 potato varieties, of which 23 Romanian and one Dutch (Sante).

Under climate issue, Suceava Plateau, is characterized by an annual average rainfall of 586.8 mm and 414.0 mm for the whole year during the growing season and annual middle temperature is 7.8°C throughout the year and 14.9°C during the growing season (tab 1). Regarding the precipitation, all the years of experimentation have significantly exceeded the annual average for the whole year and during 2005 and 2006 growing seasons have been above normal rainfall with 205.5 mm and respectively 260.6 mm, in 2007 was normal. In terms of annual average temperature, 2005 and 2007 were warm by 2.2°C and respectively 1.8°C, in 2006 was normal. During the growing season, 2005 and 2007 exceeded the annual average by 1.7°C respectively 1.8°C and in 2006 was normal.

Mountain area, where we conducted research, is characterized by an annual average rainfall of 726.2 mm, of which 531.0 mm in the vegetation period (tab.2). In terms of rainfall, the year 2007 was over annual average of 31.5 mm throughout the year and close to normal during the growing season. Years 2005 and 2006 have been lower than normal values but insignificant for the whole year and significantly above normal values during the growing season with 83 mm and respectively 106.9 mm. Annual average temperature in this area are 6.4°C throughout the year and 12.7°C during the growing season. In this regard 2005 and 2006 years were normal throughout the year and slightly above the annual average during growing season.

Table 1
The climatic conditions during experimented period, Suceava (2005-2007)

Year	Months												
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Sum Aver.
Precipitations mm													
2005	36.0	40.2	19.7	100.6	108.9	116.9	45.3	227.3	20.5	44.4	29.9	22.8	812.5
2006	19.3	17.2	61.0	73.0	70.7	164.7	119.6	211.5	35.1	29.7	9.8	1.8	813.4
2007	10.1	45.2	41.8	32.9	53.9	30.7	105.8	169.0	67.4	87.0	43.4	34.3	721.5
MA Aver.	24.2	25.6	36.2	48.2	80.2	93.6	88.6	62.8	40.8	29,5	30.6	26.5	586.8
Temperature ° C													
2005	3.7	-0.6	5.9	9.2	16.3	19.9	21.5	19.7	13.5	8.6	3.1	-0.6	10.0
2006	-7.8	-3.3	-2.8	9.0	13.4	16.6	19.8	18.6	14.9	9.9	5.2	1.8	7.9
2007	3.7	-0.6	5.9	9.2	16.3	19.9	21.5	19.7	13.5	8.7	0.9	-2.6	9.6
MA Aver.	-4.1	-2.3	1.2	8.0	13.7	16.9	18.4	18.3	14.2	8.4	2.4	-1.9	7.8

Table 2
The climatic conditions during experimented period, Pojorata (2005-2007)

Year	Months												Sum Aver.
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Precipitations (mm)													
2005	18.8	16.8	13.4	53.6	99.1	104.1	121.8	224.5	10.8	11.6	13.2	4.9	692.7
2006	5.5	10.1	14.7	29.7	105.3	218.6	92.7	166.7	24.9	30.8	0.2	0.3	699.5
2007	6.6	14.7	57.5	31.8	155.4	45.8	93.2	146.8	47.8	113.1	22.4	22.9	757.7
MA Aver.	13.6	21.8	56.5	37.2	109.1	88.2	118.0	113.1	65.4	50.8	28.1	23.9	726.2
Temperatures (° C)													
2005	0.5	-5.4	0.3	6.2	12.4	14.7	16.5	17.1	12.1	1.3	1.1	-0.9	6.3
2006	-6.8	-0.1	0.1	7.0	11.4	14.5	17.4	17.9	12.8	1.2	1.2	-0.6	6.4
2007	2.7	-0.6	4.9	8.2	14.3	17.9	19.5	18.7	18.5	7.8	0.5	1.0	8.9
MA Aver.	-4.3	-2.7	0.9	6.5	11.3	15.0	17.0	15.4	12.0	7.0	1.0	0.5	6.4

RESULTS AND DISSCUSIONS

a) Production. In the environmental conditions of Suceava, during three years, the semi earlier cultivars Claudiu and Astral was remarked, which accomplished an yields of tubers on 34.6 t/ha and respectively 35.7 t/ha. The yields increases achieved by Astral variety was distinct significant on 3.8 t/ha in comparison with cultivar Magic took like standard and 3.6 t/ha in comparison with cultivars average yileds. The biggest yields was accomplished by cultivar Claudiu, the increase production over control (Magic) was very significant 4.9 t/ha and 4.7 t/ha in comparison with average yields of varieties (*tab. 3*).

The semi later cultivars Speranta, Nicoleta and Sante were remarked, which accomplished yields of 37.0 t/ha, 36.7 t/ha and respectively 37.1 t/ha, the increases being distinct significant on 4.1 t/ha, 3.8 t/h and respectively 4.2 t/ha, in comparison with varieties average taken as control varieties. The biggest production has made by variety Loial on 38.2 t/ha, the yields increases in

comparison with varieties average, being very significant on 5.3 t/ha. Most of varieties of potatoes taken in the study achieved lower production than the Sante variety taken as control (MT1), the minus of production were from significant to very significant. The varieties Speranta, Nicoleta and Loial achieved the same yields with varieties Sante.

Table 3

**The tubers yields at the experimented cultivars, Suceava
(average of years 2005-2007)**

Nr. crt.	Cultivar	Tubers yields			Dif. compa red with St1	Signif. compa red with St1	Dif. compa red with St2	Signif. compa red with St2
		t/ha	% compared with St1.	% compared with St1				
Semi earlier cultivars								
1	Roclas	30.3	98	98	-0.5		-0.7	
2	Magic	30.8	100	99	St1		-0.2	
3	Astral	34.6	112	112	3.8	xx	3.6	xx
4	Eterna	28.9	94	93	-1.9		-2.1	
5	Lord	29.3	94	95	-1.5		-1.7	
6	Moldovița	29.4	95	95	-1.4		-1.6	
7	Rapsodia	28.2	92	91	-2.6	0	-2.8	0
8	Triumf	31.6	103	102	-0.8		0.6	
9	Claudiu	35.7	116	115	4.9	xxx	4.7	xxx
10	Tentant	31.2	101	101	0.4		0.2	
AVERAGE		31.0	90	100	-3.6	00	St2	
Semi later cultivars								
11	Luiza	28.4	76	86	-8.7	000	-4.5	00
12	Redsec	32.7	88	99	-4.4	00	-0.2	
13	Coval	33.1	89	101	-4.0	00	0.2	
14	Productiv	33.8	91	103	-3.3	0	0.9	
15	Speranța	37.0	99	113	-0.1		4.1	xx
16	Nicoleta	36.7	99	112	-0.4		3.8	xx
17	Robusta	32.9	87	100	-4.2	00	0.0	
18	Milenium	28.0	75	85	-9.1	000	-4.9	000
19	Christian	26.4	71	80	-10.7	000	-6.5	000
20	Armonia	34.3	92	104	-2.8	0	1.4	
21	Dragomirna	32.5	88	99	-4.6	00	-0.4	
22	Loial	38.2	103	116	1.1		5.3	xxx
23	Desiree	29.7	80	90	-7.4	0	-3.2	0
24	Sante	37.1	100	113	St1		4.2	xx
AVERAGE		32.9	87	100	-4.2	00	St2	

DL 5% = 2,2 t/ha ; DL 1% = 3,5 t/ha ; DL 0,1 % = 4,6 t/ha.

In the climatic conditions from Pojorâta, averaged over three years, the semi earlier varieties behaved, in terms of production like that in Suceava, but with lower values. Astral has developed a tubers yield on 32.3 t/ha, the production increases in comparison with variety Magic (ST1) and from the average of varieties (St2) being distinct significant from 3.5 t/ha respectively 3.2 t/ha. Claudiu variety accomplished the biggest production of 33.8 t/ha, very significant growth, compared by both standards considered, of 5.0 t/ha respectively 4.7 t/ha (table 4).

The semi later varieties Speranta and Nicoleta, were remarked with yields of 33.2 t/ha and 33.6 t/ha, increases being distinct significant compared with the average of the varieties (St2), from 2.6 t/ ha and 3.0 t/ ha. Robusta, Loial and Dragomirna achieved the highest yields of tubers under the conditions of the Pojorâta, of 36.1 t/ha, 33.7 t/ha respectively 5.8 t/ha (tab.4). In comparison with Sante variety, used as a control (ST1), the varieties Robusta and Loial have achieved significant increases. The varieties Millennium, Cristian and Desiree behaved the worst, yields, the decline were very significant in comparison with Sante variety (tab.4).

Table 4

The tubers yields at the experimented varieties, Pojorata (average 2005-2007)

Nr. crt.	Cultivar	Tubers yields			Dif. compa red with St1	Signif. compa red with St1	Dif. compa red with St2	Signif. compa red with St2
		t/ha	% compa red with St1.	% compa red with St1				
Semi earlier cultivars								
1	Roclas	29.9	104	103	1.1		0.8	
2	Magic	28.8	100	99	ST1		-0.3	
3	Astral	32.3	112	111	3.5	xx	3.2	xx
4	Eterna	25.8	89	89	-3.0	0	-3.3	00
5	Lord	26.7	93	92	-2.1	0	-2.4	0
6	Moldovița	30.7	106	105	1.9		1.6	
7	Rapsodia	28.1	98	96	-0.7		-1.0	
8	Triumf	30.2	105	104	1.4		1.1	
9	Claudiu	33.8	117	116	5.0	xxx	4.7	xxx
10	Tentant	27.1	94	93	-1.7		-2.0	0
AVERAGE		29.1	101	100	0.3			
Semi later cultivars								
11	Luiza	28.9	89	94	-3.7	00	-1.7	
12	Redsec	29.8	91	97	-2.8	0	-0.8	
13	Coval	29.1	89	95	-3.5	00	-1.5	
14	Productiv	31.3	96	102	-1.3		0.7	
15	Speranța	33.2	102	109	0.6		2.6	xx
16	Nicoleta	33.6	103	110	1.0		3.0	xx
17	Robusta	36.1	111	118	3.5	xx	5.5	xxx
18	Milenium	26.1	80	85	-6.5	000	-4.5	00
19	Christian	24.0	74	78	-8.6	000	-6.6	00
20	Armonia	28.4	87	93	-4.2	00	-2.2	0
21	Dragomir na	33.7	103	110	1.1		3.1	xxx
22	Loial	36.4	112	119	3.8	xx	5.8	xxx
23	Desiree	25.1	77	82	-7.5	000	-5.5	000
24	Sante	32.6	100	107	Mt1		2.0	x
AVERAGE		30.6	94	100	-2.0	0		Mt2

DI 5% = 2,0 t/ha; DI 1% = 3,1 t/ha ; DL 0,1% = 4,5 t/ha

Regarding the number of tubers in the nest, it observed that this descriptor differ much more function by variety and more less function by precocity (table 5). The biggest numbers of tubers in the nest was accomplished by the semi earlier variety Claudiu (11.5), which conducted the highest production too. The very significant increases in comparison with standard were obtained by Claudiu variety, which was due to the high percentage of tubers in the nest, between 40-80g

and of the commercial tubers (> 80 g). Also, The Astral variety is highlighted by a large number of tubers in the nest, between 40-80 g and 80 g, because of this, the cultivar Astral achieved the distinct significant increase yield in comparison with standards. The semi later cultivars Loial and Robusta, achieved the highest number of tubers in the nest, 11.6 and respectively 11.8, and the biggest numbers of the commercial tubers in the nest of 3.7 and respectively 3.1.

Table 5

**The middle tubers numbers and tubers percentage on the size categories
(average 2005-2007)**

Nr. Crt.	Cultivar	TOTAL		0-40 g		40-80 g		> 80 g	
		nr.	%	nr.	%	nr.	%	Nr.	%
Semi earlier cultivars									
1	Roclas	9.4	116	6.2	129	2.0	143	1.2	63
2	Magic	8.1	100	4.8	100	1.4	100	1.9	100
3	Astral	10.1	125	3.0	63	4.6	328	2.5	131
4	Eterna	9.3	115	6.3	131	2.1	150	0.9	47
5	Lord	6.7	83	4.4	92	1.1	78	1.2	63
6	Moldovița	10.3	127	4.2	87	1.6	114	1.3	68
7	Rapsodia	7.1	88	5.3	110	1.6	114	1.2	63
8	Triumf	10.1	125	6.7	139	1.8	128	1.6	84
9	Claudiu	11.5	142	4.8	100	3.6	257	3.1	163
10	Tentant	7.5	93	6.2	129	0.9	64	0.4	21
Semi later cultivars									
11	Luiza	8.8	81	7.3	143	1.2	44	0.4	13
12	Redsec	8.6	80	6.2	121	1.5	55	0.8	27
13	Coval	9.4	78	7.2	141	1.5	55	0.6	20
14	Productiv	10.3	95	8.5	167	1.0	37	0.8	27
15	Speranța	12.3	114	5.6	110	4.3	159	2.4	80
16	Nicoleta	11.6	107	6.1	120	2.5	93	1.7	57
17	Robusta	11.8	109	5.2	102	3.5	129	3.1	103
18	Milenium	8.2	76	4.8	94	2.3	85	1.1	37
19	Christian	6.8	91	4.7	92	1.2	44	0.9	30
20	Armonia	9.0	83	6.0	118	2.0	74	1.0	33
21	Dragomirna	10.1	94	4.9	96	2.6	96	2.6	87
22	Loial	11.6	107	4.0	78	3.9	144	3.7	123
23	Desiree	8.5	79	6.8	133	1.0	37	0.7	23
24	Sante	10.8	100	5.1	100	2.7	100	3.0	100

b) The vegetation period – The vegetation period of the experimented cultivars was between 85 and 107 days. From the semi earlier group the shortest vegetation period had the cultivars Trumf and Roclas (85 days) and from the semi later group the cultivars Redsec (100 days). From the all experimented cultivars the longest vegetation period had the cultivars Nicoleta (107 days).

c) The diseases resistance – The viruses attack was between 2% and 11%, the most sensitive were cultivars Desiree, Rapsodia, Moldovița, Triumf and Dragomirna. From point of view of resistance to late blight of potato attack, the most sensitive cultivars were the semi earlier cultivars Tentant, Rapsodia and Triumf, in all experimented years, the most resistant were the cultivars Claudiu and Eterna. From the semi later cultivars group, the most sensitive to the late blight

of potato attack were cultivars Dragomirna and Luiza, and the most resistant were Robusta, Nicoleta and Speranta

CONCLUSIONS

1. In the ecological conditions of the Suceava Plateau (Suceava), on a soil of Chernisoils class, on *faeoziom cambic* type and subtype, the semi earlier cultivars Claudiu and Astral accomplished the biggest tubers yields on 34.6 t/ha and respectively 35.7 t/ha. The semi later cultivars Loial (38.2 t/ha), Sante (37,1 t/ha), Speranța (37,0 t/ha), Nicoleta (36,7 t/ha) and Robusta (36,1 t/ha), were accomplished very significant increases production between 3.1 t/ha and 5.8 t/ha.

2. The numbers of the tubers in the nest differ much more function by the cultivar and less function by precocity. The big yields realized by the cultivars Claudiu, Astral, Loial and Robusta was due to the big number of the tubers in the nest between 40-80g and commercial ones, over 80 g.o.

3. The vegetation period duration at experimented cultivars was between 85-107 days function by precocity group.

4. From point of view of diseases resistance, the viruses attack was comprised between 2% and 11%, the most sensitive were the cultivars: Desiree, Rapsodia, Moldovița Lord, Triumf and Dragomirna. From point of view of resistance to late blight of potato attack, the most sensitive cultivars were the semi earlier cultivars Tentant , Rapsodia and Triumf

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