

EXTRA EARLY AND EARLY POTATO PRODUCTION IN OPEN FIELD AND TUNNEL WITH TRANSPARENT FOIL, IN THE HILLY PART OF TRANSYLVANIA

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Abstract. Even though it is considered a simple and cheap nutriment, the food of the poor and the plant of under-privileged areas, the potato benefits from a wide popularity, being considered, beside other crops, a revelation in the cultivation of plants, this becoming a basis nutriment for the whole earth population. It is being required more and more to produce as soon as possible great quantities of early potato for consumption, both for satisfying the supply needs of the market internally and for the export requests. The technology of cultivating extra-early and early potatoes comprises of specific elements, such as choosing and preparing the land, so as to ensure a more pronounced early emergence, choosing the soil and preparing the tubers before the planting, differently applying the attendance proceedings, protecting the in-field cultures with plastic foils.

Key words: potato, technology, protection, sprouted

INTRODUCTION

Early potatoes comes to improve the diet of population, because this is a fresh food, rich in vitamins, mineral salts at a time when most fruits and vegetables did not appear on the market and fall potatoes lost some quality from storage over the winter. For farmers extra early potatoes and early potatoes culture is very important in terms economic because very early in the spring you can get increased market prices.

Potato, considered a simple and cheap food, plant deprived areas, it enjoys great popularity, being considered among other crop cultures revelation, becoming a staple food for the entire population of the world.

Besides being a tasty and nutritious food, potatoes provide the main source of income for many farmers specialized in potato, which is an excellent culture for different crop rotations, integrated well in the farms that are growing grain or vegetables.

The earlier production of large quantities of extra early and early potatoes for consumption should be increasingly more to supply the domestic market and export market requirements.

To contribute to the improvement of extra early and early potato cultivation technology, research has addressed some aspects of the overall efficiency of potato culture protection with plastic foil in order to obtain extra early and early production in the hills of Transylvania.

MATERIAL AND METHOD

The studied varieties were Ostara, Agata and Impala. In the culture system was used the experiments in tunnels with transparent foil. Most important technological work in order to obtain extra early and early potatoes is the preparation the tuber before planting, so after sorting and calibration tubers were presprouting, sprouting and rooting.

As regards the suitability of the studied species, there has been analyzed the earliness degree, the production obtained from the variants of preparing the plating material (pre-sprouted, sprouted, rooted) and the enhancement of the earliness which are added by the methods of protecting the culture.

Factors and graduations. The factors studied for accomplishing the experiments are:

Factor (A): **Potato species** with graduations:

a₁ – Ostara;

a₂ – Impala;

a₃ – Agata;

Factor (B): **Protecting the crop**, with graduations:

b₁ – unprotected;

b₂ – in tunnels with transparent polyethylene foil;

Factor (C): **Preparing the tubers before cultivation**, with graduations:

c₁ – non-sprouted;

c₂ – pre-sprouted;

c₃ – sprouted;

c₄ – sprouted and rooted.

RESULTS AND DISCUSSION

The results obtained in the case of producing potatoes in 2007 year was influenced in first phase of accumulation by adverse weather conditions, because the last frost it was late in May, (Table 1). Since the second decade of June there has been a dramatic increase in production, reaching 15 June at version sprouted to 11,973 kg / ha with a difference of over 3000 kg / ha compared to the unprotected version and by root tuber production approaching 14,000 kg / ha, the difference of culture unprotected in this case exceeds 3000 kg / ha.

For potato production begins early June from 3000 - 3500 kg / ha and reaches 15,700 to 16,900 kg / ha at the end of this month.

Commercial production reached more than 11,000 kg / ha, the largest difference being in the open culture of 2400-2600 kg / ha on 9.06.

In the low tunnel production is accumulates continuously until the end of the growing season, i.e. varieties of potatoes times during the growing season may end in tunnel under normal differences when tuber is practically canceled rooted plants get the physiological maturity in tunnel (table 1).

As shown in table 2 in the experimental year 2007, Impala variety yields obtained are lower in the first three harvest date because the last frost in late May that affected early potato crop. Since the second decade of June accumulations are significant production version unsprouted tuber crop production exceeded 3000 kg/ha for all sizes and the sprouting tuber production approaching 5,000 kg/ha in medium size and high culture in the tunnel. On June 14 we obtained a total production of 14080 kg/ha of which was 9955kg/ha commercial production and by the root tubers of 16520 kg/ha total production commercial production exceeding 11000 kg / ha.

From these results Impala variety proves to be a much safer kind for early potato variety Ostara, in Cluj area, than at the end of June can overcome commercial production

from 12,500 to 12,700 kg / ha in presprouting and sprouting and rooting and protected by low tunnel with transparent polyethylene.

From table 3 we notice a small productions obtained in 2007 year, the first two harvest date, of Agata variety is also affected as much as the other two varieties experienced unfavorable conditions extra early and early potato crop in late May, yields obtained at that time by sprouting and rooting planting ranging between 1900 - 2000 kg/ha. Starting in the second decade of June early potato production increased significantly, from June 14 through sprouting tubers was carried 11919 kg/ha and at the end it was 16780 kg/ha.

By sprouting and root tubers before planting in the tunnel at the end of June, we obtained a production about 17530 kg/ha with a difference of 2366 kg/ha compared to open field culture.

In conclusion Agata variety grown in tunnels and open fields can produce only early potatoes in June.

The results obtained in the case of producing potatoes prepared by different stimulation methods in tunnels of transparent polyethylene foil highlight an approach, an equalization of production between the non-sprouted and pre-sprouted material, the temperature created in the soil by covering it with transparent foil in the shape of tunnels stimulating even more the appearance of sprouts at the non-sprouted tubers than the growth of sprouts at the pre-sprouted tubers, in the end the productions of the experimented species being equal.

In the case of the low housings tunnel-type, production continuously accumulates until the end of the vegetation period of the potatoes or, in other words, the early potato species can end their vegetation period in normal conditions in tunnels, the differences in the case of rooted tubers being practically cancelled, this meaning that the plants in the tunnel reach the physiological maturation.

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Table 1

Production of first and second early potato variety obtained in field and tunnel condition in 2007

Harvested potato size	Data collection	Variety Ostara 2007											
		Production kg&ha											
		Open field				Tunel Tunnel				Differences in production between the two variants			
		<i>Neî.(1)</i>	<i>Preî.(2)</i>	<i>Înc.(3)</i>	<i>Înr.(4)</i>	<i>Neî.(5)</i>	<i>Preî.(6)</i>	<i>Înc.(7)</i>	<i>Înr.(8)</i>	<i>(5)-(1)</i>	<i>(6)-(2)</i>	<i>(7)-(3)</i>	<i>(8)-(4)</i>
28-35 mm	24.05	146	258	350	500	360	375	546	500	214	117	196	0
	2.06	256	372	548	600	470	564	806	1020	214	192	258	420
	9.06	680	750	987	1260	1500	1760	2410	2823	820	1010	1423	1563
	14.06	1800	1920	2350	3080	2900	3156	3938	4688	1100	1236	1588	1608
	21.06	2942	3110	3710	4260	3750	3880	4681	5446	808	770	971	1186
	28.06	3420	3864	5140	5506	4370	4500	5163	5300	950	636	23	-206
35-45 mm	24.05	170	210	280	400	314	350	580	835	144	140	300	435
	2.06	253	356	425	650	500	620	1160	1326	247	264	735	676
	9.06	1253	1760	2004	2860	2740	2640	3330	3762	1487	880	1326	902
	14.06	1756	2060	3084	3900	3251	3610	3975	4200	1495	1550	891	300
	21.06	3240	3460	4900	5520	3964	4070	4520	5685	724	610	-380	165
	28.06	3610	3735	5500	5880	4580	4710	5240	5750	970	975	-260	-130
>60 mm	24.05	110	245	580	320	340	375	480	740	230	130	-100	420
	2.06	260	450	635	862	494	774	1097	1200	234	324	462	338
	9.06	850	1720	2040	2500	2120	2480	3120	4246	1270	760	1080	1746
	14.06	2020	2655	3460	3825	3360	3500	4060	4980	1340	845	600	1155
	21.06	3350	3830	4460	4900	3782	3910	4860	5560	432	80	400	660
	28.06	3864	4230	5390	5703	4467	4653	5364	5900	603	423	-26	197
Total	24.05	426	713	1210	1220	1014	1100	1606	2075	588	387	396	855
	2.06	769	1178	1608	2112	1464	1958	3063	3546	695	780	1455	1434
	9.06	2783	4230	5031	6620	6360	6880	8860	10831	3577	2650	3829	4211
	14.06	5576	6635	8894	10805	9511	10266	11973	13868	3935	3631	3079	3063
	21.06	9532	10400	13070	14680	11496	11860	14061	16691	1964	1460	991	2011
	28.06	10894	11829	16030	17089	13417	13863	15767	16950	2523	2034	-263	-139
Commercial production	24.05	280	455	860	720	654	725	1060	1575	374	270	200	855
	2.06	513	806	1060	1512	994	1394	2257	2526	481	588	1197	1014
	9.06	2103	3480	4044	5360	4860	5120	6450	8008	2757	1640	2406	2648
	14.06	3776	4715	6544	7725	6611	7110	8035	9180	2835	2395	1491	1455
	21.06	6590	7290	9360	10420	7746	7980	9380	11245	1156	690	20	825
	28.06	7474	7965	10890	11583	9047	9363	10604	11650	1573	1398	-286	67

Table 2

Production of first and second early potato variety obtained in field and tunnel condition in 2007

Harvested potato size	Data collection	Variety Impala 2007											
		Production kg/ha											
		Open field				Tunnel				Differences in production between the two variants			
		<i>Neî. (1)</i>	<i>Preî.(2)</i>	<i>Înc.(3)</i>	<i>Înr.(4)</i>	<i>Neî.(5)</i>	<i>Preî (6)</i>	<i>Înc.(7)</i>	<i>Înr.(8)</i>	<i>(5)-(1)</i>	<i>(6)-(2)</i>	<i>(7)-(3)</i>	<i>(8)-(4)</i>
28-35 mm	24.05	246	250	260	300	392	480	648	872	146	230	388	572
	2.06	350	420	510	780	521	645	893	1054	171	225	383	274
	9.06	930	1024	1250	1780	1960	2560	2900	4562	1030	1536	1650	2782
	14.06	2000	2300	2350	2750	3240	3700	4125	5380	1240	1400	1775	2630
	21.06	2730	2860	3900	4601	4220	4860	5850	6000	1490	2000	1950	1399
	28.06	3400	3540	4440	5080	4900	5320	6200	5910	1500	1780	1760	830
35-45 mm	24.05	250	285	350	420	426	366	602	680	176	81	252	260
	2.06	400	750	800	1080	664	700	905	1087	264	-50	105	7
	9.06	1430	1550	1870	2534	2740	3000	3760	4520	1310	1450	1890	1986
	14.06	2300	2460	2950	3560	3260	3750	4975	5540	960	1290	2025	1980
	21.06	3540	3600	4160	4800	4400	4870	5500	6360	860	1270	1340	1560
	28.06	4230	4502	4808	5600	5740	5900	6480	6300	1510	1398	1672	700
>60 mm	24.05	180	267	324	560	364	440	680	700	184	173	356	140
	2.06	355	830	620	475	642	735	983	1180	287	-95	363	705
	9.06	1100	1428	1746	2300	3020	3560	3940	4300	1920	2132	2194	2000
	14.06	2700	2831	3560	3820	3880	4404	4980	5600	1180	1573	1420	1780
	21.06	3400	3360	4020	4760	5040	5250	5826	6420	1640	1890	1806	1660
	28.06	4400	4700	4964	5300	5640	5800	6250	6210	1240	1100	1286	910
Total	24.05	676	802	934	1280	1182	1286	1930	2252	506	484	996	972
	2.06	1105	2000	1930	2335	1827	2080	2781	3321	722	80	851	986
	9.06	3460	4002	4866	6614	7720	9120	10600	13382	4260	5118	5734	6768
	14.06	7000	7591	8860	10130	10380	11854	14080	16520	3380	4263	5220	6390
	21.06	9670	9820	12080	14161	13660	14980	17176	18780	3990	5160	5096	4619
	28.06	12030	12742	14212	15980	16280	17020	18930	18420	4250	4278	4718	2440
Commercial production	24.05	430	552	674	980	790	806	1282	1380	360	254	608	400
	2.06	755	1580	1420	1555	1306	1435	1888	2267	551	-145	468	712
	9.06	2530	2978	3616	4834	5760	6560	7700	8820	3230	3582	4084	3986
	14.06	5000	5291	6510	7380	7140	8154	9955	11140	2140	2863	3445	3760
	21.06	6940	6960	8180	9560	9440	10120	11326	12780	2500	3160	3146	3220
	28.06	8630	9202	9772	10900	11380	11700	12730	12510	2750	2498	2958	1610

Table 3

Production of first and second early potato variety obtained in field and tunnel condition in 2007

Harvested potato size	Data collection	Variety Agata 2007											
		Production kg&ha											
		Open field				Tunnel				Differences in production between the two variants			
		<i>Neî. (1)</i>	<i>Preî.(2)</i>	<i>Înc.(3)</i>	<i>Înr.(4)</i>	<i>Neî.(5)</i>	<i>Preî.(6)</i>	<i>Înc.(7)</i>	<i>Înr.(8)</i>	<i>(5)-(1)</i>	<i>(6)-(2)</i>	<i>(7)-(3)</i>	<i>(8)-(4)</i>
28-35 mm	24.05	180	200	540	586	340	435	732	680	160	235	192	94
	2.06	320	472	705	842	420	512	960	900	100	40	255	58
	9.06	645	720	1508	1960	900	1105	2780	3346	255	385	1272	1386
	14.06	1760	1900	2312	3220	1886	2320	3976	4140	126	420	1664	920
	21.06	2500	2640	3940	4050	2980	3406	5420	5765	480	766	1480	1715
	28.06	3480	3834	4480	4904	3900	4080	5720	5800	420	246	1240	896
35-45 mm	24.05	200	300	492	700	330	440	560	600	130	140	68	-100
	2.06	280	326	694	945	450	510	786	902	170	184	92	-43
	9.06	800	1050	1532	1656	1036	1340	2840	3168	236	290	1308	1512
	14.06	1500	1740	2694	2875	2350	2540	3968	4406	850	800	1274	1531
	21.06	2760	2822	3800	3740	3374	3590	4648	4850	614	768	848	1110
	28.06	3500	3690	4720	4860	4046	4264	5300	5680	546	574	580	820
>60 mm	24.05	136	230	560	800	480	571	640	760	344	341	80	-40
	2.06	200	600	924	1400	930	1027	1300	1650	730	427	376	250
	9.06	600	960	1496	1940	1000	1380	2654	3800	400	420	1158	1860
	14.06	1350	1540	2100	3120	1950	2570	3975	4400	600	1030	1875	1280
	21.06	2450	2640	3640	4240	2800	3440	4722	5200	350	800	1082	960
	28.06	3020	3740	4084	5400	3460	4200	5760	6050	440	460	1676	650
Total	24.05	516	730	1592	2086	1150	1446	1932	2040	634	716	340	-46
	2.06	800	1398	2323	3187	1800	2049	3046	3452	1000	651	723	265
	9.06	2045	2730	4536	5556	2936	3825	8274	10314	891	1095	3738	4758
	14.06	4610	5180	7106	9215	6186	7430	11919	12946	1576	2250	4813	3731
	21.06	7710	8102	11380	12030	9154	10436	14790	15815	1444	2334	3410	3785
	28.06	10000	11264	13284	15164	11406	12544	16780	17530	1406	1280	3496	2366
Commercial production	24.05	336	530	1052	1500	810	1011	1200	1360	474	481	148	-140
	2.06	480	926	1618	2345	1380	1537	2086	2552	900	611	468	207
	9.06	1400	2010	3028	3596	2036	2720	5494	6968	636	710	2466	3372
	14.06	2850	3280	4794	5995	4300	5110	7943	8806	1450	1830	3149	2811
	21.06	5210	5462	7440	7980	6174	7030	9370	10050	964	1568	1930	2070
	28.06	6520	7430	8804	10260	7506	8464	11060	11730	986	1034	2256	1470