

DIFFERENCES BETWEEN DIFFERENT METHODS OF PROTECT AND PREPARATION OF POTATO SEED TUBERS OF OSTARA, AGATA AND IMPALA VARIETY UPON GAIN IN EARLYNESS, IN THE HILLY AREA OF CLUJ

Topan C., S. Vatca, Livia Naghiu, Adriana David

*University of Agricultural Sciences and Veterinary Medicine, Faculty of Agriculture,
3-5 Manastur Street, 400372, Cluj-Napoca, Romania*

Abstract. Culture provides good storage tunnels by the end of the growing season, from solar, where in the second decade of June, production is reduced due to high temperatures in these areas. Increase the earliness of the culture in crops solar tunnel is lower, where yields of 27C are higher than the same variations in the tunnel on 28 June. In 2007, we obtained much earlier in solar production to culture in tunnels, the latter are effective because we get early yields of about 10 t / ha in mid-June.

Keywords: potato, earliness, sprouting, solar, tunnels

INTRODUCTION

Extraearly potato culture today has become a necessity for growers of vegetables in greenhouses and tunnels as potatoes, cultivating it into the successive crops grown in greenhouses vegetables, tomatoes, peppers, cucumbers, contributing to high efficiency operation of protecting these areas of culture, increase their profitability and increasing benefits to growers.

Production as early as the large amounts of early potato consumption should be increasingly more both supply needs of domestic market and for export requirements.

MATERIAL AND METHOD

The results of the research, which are presented in this paper have addressed some aspects of the overall efficiency of potato crop protection with transparent polyethylene in the form of lower housing and culture in greenhouses tunnel to obtain early and extraearly production in the specific area of Cluj, Jucu in 2007.

Varieties were studied are Ostara, Impala and Agata, early varieties by the technology what we applied. Regarding the suitability of varieties under study, we studied the degree of earliness, yields from the options planting preparation (presprouted, sprouts, root) and increased earliness bring you protect low culture through the tunnel shelters in compared with plastic greenhouse.

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 – in tunnels with transparent polyethylene foil;

B₂ - in plastic plastic greenhouse;

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

c₁ – non-sprouted;

c₂ – pre-sprouted;

c₃ – sprouted;

c₄ –sprouted and rooted;

Made to use the experiences of culture in plastic greenhouse system and in tunnels.

RESULTS AND DISCUSSION

The experimental year 2007 was a year of early and warm spring which led to an early planting potato crop in plastic greenhouse. The variety Ostara first collection was made in late April (Table 1.) When the option sprouting tuber extraearly crop production achieved a total of over 4,400 kg / ha and the root tubers that exceeds the threshold of 7,000 kg / ha.

Table 1.

Production of first and second earlies potato variety obtained in tunnel and plastic greenhouse condition in 2007

Harvested potato size	Data collection	Variety Ostara 2007								
		Production kg/ha								
		Tunnel				Data collection	Plastic greenhouse			
Nei. (1)	Prei. (2)	Înc. (3)	Înr. (4)	Nei. (5)	Prei. (6)		Înc. (7)	Înr. (8)		
28-35 mm	24.05	360	375	546	500	30.04	0	400	1040	2700
	2.06	470	564	806	1020	7.05	200	1430	1874	3420
	9.06	1500	1760	2410	2823	13.05	1240	1600	2820	3120
	14.06	2900	3156	3938	4688	20.05	2040	2440	4350	6560
	21.06	3750	3880	4681	5446	27.05	3248	3416	5210	6730
	28.06	4370	4500	5163	5300	3.06	3700	3900	5800	6020
35-45 mm	24.05	314	350	580	835	30.04	0	464	1700	2512
	2.06	500	620	1160	1326	7.05	420	740	2400	2900
	9.06	2740	2640	3330	3762	13.05	2054	3122	3785	4000
	14.06	3251	3610	3975	4200	20.05	2890	2040	4620	5310
	21.06	3964	4070	4520	5685	27.05	3684	4020	5540	6400
	28.06	4580	4710	5240	5750	3.06	4310	4875	5807	5862
>60 mm	24.05	340	375	480	740	30.04	408	460	1700	1920
	2.06	494	774	1097	1200	7.05	1700	1900	3320	3328
	9.06	2120	2480	3120	4246	13.05	2272	2480	4106	4380
	14.06	3360	3500	4060	4980	20.05	2160	2320	4630	6070
	21.06	3782	3910	4860	5560	27.05	4200	4526	5352	6300
	28.06	4467	4653	5364	5900	3.06	4960	5164	5970	6000
Total	24.05	1014	1100	1606	2075	30.04	408	1324	4440	7132
	2.06	1464	1958	3063	3546	7.05	2320	4070	7594	9648
	9.06	6360	6880	8860	10831	13.05	5566	7202	10711	11500
	14.06	9511	10266	11973	13868	20.05	7090	6800	13600	17940
	21.06	11496	11860	14061	16691	27.05	11132	11962	16102	19430
	28.06	13417	13863	15767	16950	3.06	12970	13939	17577	17882
Commercial production	24.05	654	725	1060	1575	30.04	408	924	3400	4432
	2.06	994	1394	2257	2526	7.05	2120	2640	5720	6228
	9.06	4860	5120	6450	8008	13.05	4326	5602	7891	8380
	14.06	6611	7110	8035	9180	20.05	5050	4360	9250	11380
	21.06	7746	7980	9380	11245	27.05	7884	8546	10892	12700
	28.06	9047	9363	10604	11650	3.06	9270	10039	11777	11862

The table below notice the difference of time between the first data collection between the two types of potato culture protection. While the culture was harvested solar on 30.04, the culture in the tunnel first harvest was on 24.05, when the sprouting tuber production goes slightly over 1500 kg / ha and the root tuber production obtained is only 2075 kg/ha. By cultivating potatoes in plastic greenhouse in early June by sprouting and rooting productions are obtained over 17000 kg/ha while the alternative culture in the tunnel at the same time the total production harvested was 3063 kg/ha respectively 3546 kg/ha. The potato cultivation in low tunnel shelters are achieved total production of more than 11,000 kg/ha beginning of the second decade of June, which shows that the growth of potato cultivation in plastic greenhouse earliness which brings this method is superior protection to culture in the tunnels.

Table 2.

Production of first and second earlies potato variety obtained in tunnel and plastic greenhouse condition in 2007

Harvested potato size	Data collection	Variety Impala 2007								
		Production kg/ha								
		Tunnel				Data collection	Plastic greenhouse			
	<i>Nei.</i> (1)	<i>Prei.</i> (2)	<i>Inc.</i> (3)	<i>Înr.</i> (4)		<i>Nei.</i> (5)	<i>Prei.</i> (6)	<i>Inc.</i> (7)	<i>Înr.</i> (8)	
28-35 mm	24.05	392	480	648	872	30.04	400	420	614	1236
	2.06	521	645	893	1054	7.05	1254	1370	2080	2634
	9.06	1960	2560	2900	4562	13.05	2205	2474	3285	4620
	14.06	3240	3700	4125	5380	20.05	3400	3626	4670	5375
	21.06	4220	4860	5850	6000	27.05	4684	4873	6050	6660
	28.06	4900	5320	6200	5910	3.06	5700	5800	6840	7000
35-45 mm	24.05	426	366	602	680	30.04	607	806	1000	1480
	2.06	664	700	905	1087	7.05	1300	1560	2706	3160
	9.06	2740	3000	3760	4520	13.05	2950	3200	3900	4600
	14.06	3260	3750	4975	5540	20.05	3840	4360	5175	5700
	21.06	4400	4870	5500	6360	27.05	4900	5140	5950	6800
	28.06	5740	5900	6480	6300	3.06	5670	5807	6730	7560
>60 mm	24.05	364	440	680	700	30.04	380	660	1040	1600
	2.06	642	735	983	1180	7.05	1550	1684	2728	3480
	9.06	3020	3560	3940	4300	13.05	3668	3934	4800	5200
	14.06	3880	4404	4980	5600	20.05	4657	4960	5940	6010
	21.06	5040	5250	5826	6420	27.05	5367	5520	6760	6680
	28.06	5640	5800	6250	6210	3.06	5960	6040	6020	5900
Total	24.05	1182	1286	1930	2252	30.04	1387	1886	2654	4316
	2.06	1827	2080	2781	3321	7.05	4104	4614	7514	9274
	9.06	7720	9120	10600	13382	13.05	8823	9608	11985	14420
	14.06	10380	11854	14080	16520	20.05	11897	12946	15785	17085
	21.06	13660	14980	17176	18780	27.05	14951	15533	18760	20140
	28.06	16280	17020	18930	18420	3.06	17330	17647	19590	20460
Commercial production	24.05	790	806	1282	1380	30.04	987	1466	2040	3080
	2.06	1306	1435	1888	2267	7.05	2850	3244	5434	6640
	9.06	5760	6560	7700	8820	13.05	6618	7134	8700	9800
	14.06	7140	8154	9955	11140	20.05	8497	9320	11115	11710
	21.06	9440	10120	11326	12780	27.05	10267	10660	12710	13480

Also noted the high levels of commercial production of extraearly potato over 10800 kg/ha and over 12700 kg/ha obtained on 27 May at the plastic greenhouse variations and root sprouts and sprouting higher than yields from the same variations in the tunnel at the time June 28 of 10604 kg/ha or 11650 kg/ha of early potato (table 1).

From Table 2, the variety Impala in 2007, tuberization tubers occurred much earlier in the culture in shelters plastic greenhouse low tunnel. Extraearly potato production stands solar obtained by the end of May, when the sprouting seed tubers achieved a total

production of 18760 kg/ha and the total production by rooting was 20140 kg/ha, of which 12710 kg/ha and 13480 kg/ha is extraearly commercial production. The low tunnel cultivation shelters can only speak of a culture of potato early because they get efficient production exceeding 10.000 kg / ha only in mid-June.

Table 3.

Production of first and second earlies potato variety obtained in tunnel and plastic greenhouse condition in 2007

Harvested potato size	Data collection	Variety Agata 2007								
		Production kg/ha								
		Tunnel				Data collection	Plastic greenhouse			
		Neț. (1)	Preț. (2)	Înc. (3)	Înr. (4)		Neț. (5)	Preț. (6)	Înc. (7)	Înr. (8)
28-35 mm	24.05	340	435	732	680	30.04	240	240	600	935
	2.06	420	512	960	900	7.05	320	358	850	1058
	9.06	900	1105	2780	3346	13.05	1158	1320	2040	3606
	14.06	1886	2320	3976	4140	20.05	2024	2250	3960	5880
	21.06	2980	3406	5420	5765	27.05	2967	3040	5160	7280
	28.06	3900	4080	5720	5800	3.06	3425	3925	6080	6960
35-45 mm	24.05	330	440	560	600	30.04	240	372	635	941
	2.06	450	510	786	902	7.05	350	478	897	1100
	9.06	1036	1340	2840	3168	13.05	1440	1540	2490	3300
	14.06	2350	2540	3968	4406	20.05	2300	2500	4060	4800
	21.06	3374	3590	4648	4850	27.05	2854	3010	6300	7266
	28.06	4046	4264	5300	5680	3.06	3650	3820	6240	6600
>60 mm	24.05	480	571	640	760	30.04	180	220	592	750
	2.06	930	1027	1300	1650	7.05	260	340	762	2535
	9.06	1000	1380	2654	3800	13.05	1200	1908	2250	3560
	14.06	1950	2570	3975	4400	20.05	1960	2740	3460	6664
	21.06	2800	3440	4722	5200	27.05	2340	2860	6210	6980
	28.06	3460	4200	5760	6050	3.06	3704	3964	5960	5875
Total	24.05	1150	1446	1932	2040	30.04	660	832	1827	2626
	2.06	1800	2049	3046	3452	7.05	930	1176	2509	4693
	9.06	2936	3825	8274	10314	13.05	3798	4768	6780	10466
	14.06	6186	7430	11919	12946	20.05	6284	7490	11480	17344
	21.06	9154	10436	14790	15815	27.05	8161	8910	17670	21526
	28.06	11406	12544	16780	17530	3.06	10779	11709	18280	19435
Commercial production	24.05	810	1011	1200	1360	30.04	420	592	1227	1691
	2.06	1380	1537	2086	2552	7.05	610	818	1659	3635
	9.06	2036	2720	5494	6968	13.05	2640	3448	4740	6860
	14.06	4300	5110	7943	8806	20.05	4260	5240	7520	11464
	21.06	6174	7030	9370	10050	27.05	5194	5870	12510	14246
	28.06	7506	8464	11060	11730	3.06	7354	7784	12200	12475

In comparison, the yields obtained experimentally in 2007, at the Agata variety, table 3, it appears that differences occur between the two methods extraearly and early potato cultivation. It is noted from May 27 through sprouting potato tubers total extraearly production obtained in plastic greenhouse is 17670 kg/ha, while in tunnels production from the end of May was 1932 kg/ha

In June extraearly potato production is favorable in plastic greenhouse culture where the first decade of the sprouting tuber production achieved a 2509 kg/ha and by rooting before planting material production was achieved over 4600 kg/ha.

The fact is that the variety of extraearly potato production Agata can be obtained in Cluj area tunnels and root sprouting seed potatoes or seed potatoes in plastic greenhouse minimum preîncolțit. Extraearly potato production safest the variety Agata solar are obtained by germination, light exposure and rooting.

CONCLUSIONS

Both methods of protecting the culture, the tunnel with transparent foil and the plastic plastic greenhouse, ensure the earliness of harvests.

As regards the influence of the growth conditions, there can be noticed, comparing the extra-early and early potato crop in tunnels and in plastic plastic greenhouse, the favourable conditions offered by the low housings tunnel-type.

We notice that there can be obtained large productions when cultivating potato in tunnels in the case of the culture with non-sprouted and pre-sprouted tubers, while under the plastic plastic greenhouse conditions this responded much better than the culture in tunnels of the sprouted and rooted tubers.

By cultivating potatoes in plastic greenhouse and preparing the material before the plantation, there can be obtained extra-early productions starting with the first decade of May, the production differences for the open field crop being very big.

REFERENCES

1. IANOSI I.S.-2002, Cultura cartofului pentru consum, Ed. Phoenix Brașov
2. MORAR G., și colab.-2004, Fitotehnie, Ed. Ion Ionescu de la Brad, Iași.
3. NAN I.-1999, Cultura cartofului în România vol.9 nr.1, ianuarie-martie Pregătirea materialului pentru plantare la cartof timpuriu I..C.P.C. Brașov.
4. TUȘA G.și colab.-1978, Cultura cartofului extratimpuriu, timpuriu și de vară Ed. Ceres București.
5. STAN N., și colab., 2003, Tratat de legumicultură, Ed. Ceres , București, ISBN 973-40-0594-4.