

Study of several potato cultivars from EU countries in agro-ecological conditions of Kosovo

Bardh Begolli, Dëfrime Berisha, Bakir Kelmendi

Contents

19 potato cultivars were studied in the stage of vegetation in 2010, on two agro-ecological regions of Kosovo. The points of research were the vegetation period, rudiment per hectare, dry matter and others. Results analysed have shown differences between cultivars in all parameters analysed in comparison with the indicating standard.

Key words: potato, cultivars, rudiment, dry matter.

Introduction

The potato is cultivated for its tubers, which are rich in starch and other nutritional matters, originating from Southern America. In comparison to other cultures, potatoes are the fifth most important products in terms of economic importance, after the plants from the species of *Poaceae*, wheat, rice, maize and barley (HOOKER, 1986).

Potatoes are cultivated in almost all regions of Kosovo, in plain areas and in hilly-mountainous areas (at a sea level height from 400-2000 m). In Kosovo, potatoes cover a surface area of 10.000 to 12.000 ha every year.

This culture is intensively growing in Kosovo, especially after the last war, both in consumption and in processing. Potatoes are characterized with their high content of carbon hydrates, minerals, proteins, vitamins, etc.

1. Material and method

Studies were undertaken in two agro-climatic regions of Kosovo (Arbnesh, research farm of the Kosovo Institute of Agriculture,

Peja – Dukagjini Plain, and in Pestova – Kosovo Plain). The number of cultivars studied in the experiment is 19: Safari, Triplo, Belini, Finka, Marabel, Jelly, Arnova, Manitov, Exelent, Faluka, Arizona, S2 99 – 4005, Zafira, Rudolph, Ambiton, Agata, Agria, Markies and Sinora.

Planting was made with a method of randomized blocks in three series (Fisher's randomized blocks). Seeds from the Netherlands were used for planting.

The length of lines - 4 m. distance between lines 75 cm, and distance between plants in a line 40 cm, distance between plots 2 m, surface area of experimental plot 12 m², number of plants per hectare- 33.300.

Para-culture, maize in Peja and wheat in Pestova, before planting, basic fertilization took place in both locations, with 1000 kg NPK 15:15:15. Planting was made on 27.04.2010 in Peja, and on 28.04.2010 in Pestova (manual planting). Re-fertilization with nitrogene: NAG 27% 200kg/ha (before blossoming).

Diligence measures: Herbicide used Glyfosat in autumn 5 l/ha, Metrizin (before sprouting, herbicide total 1kg/ha), Insecticide used Foksin 25kg/ha (before planting with fertilization) Actara 80gr/ha (against common scab). The first treatment in blossoming on 16.06.08, others every 20 days. Fungicides used Ridomil MZ 68 WG 2kg/ha (twice) Simopur 2kg/ha (once), and irrigation 18.06.2010, a total of 4 watering sessions in every 15 - 20 days.

French fries and chips were baked in the same pot, at a temperature of 175°C.

The colour of chips defined by standard **British potato council (2002) Preserving crop quality.**

2. Object and purpose of study

Research of cultivars:

- *Imported from the EU to Kosovo, in rudiment and other parameters;*
- *Bears special interest for agro-climatic and production conditions in Kosovo*
- *In terms of their suitability for consumption and processing (chips, French fries)*
- *In terms of their resistance against disease and defectors.*

Based on results achieved in different cultivars, to propose regionalization of cultivars for various locations in Kosovo.

2.1. Parameters studied

- Vegetative period
- Rudiment
- Dry matter
- Baking
- Disintegration or dissolution

3. Results and discussion

The duration of the vegetation period (maturity) is diverse and influenced by dates of planting, climatic conditions and cultivation practices. There are considerable differences in terms of vegetation periods, depending on variety and agro-ecological conditions in Kosovo.

3.1. Definition of vegetation, field study

Following the blossoming period, plants were inspected consistently, and since cultivars studied in the experiment pertain to various groups in terms of vegetation period, their maturity was different (**Tab. 1**).

Tab. 1. Cultivars studied and vegetative period (maturity), 2010

No.	Cultivar	Vegetative period	Origin	
1.	Safari	15.07	Very early	HZPC - Holland
2.	Triplo	15.07	Very early	HZPC - Holland
3.	Belini	30.07-20.08	Average	HZPC - Holland
4.	Finka	30.07-20.08	Average	Gjermani
5.	Maribel	20.07	Early	Gjermani
6.	Jelly	20.07	Early	Gjermani
7.	Arnova	15.07	very early	Agriko- Holland
8.	Manitov	30.07-20.08	Average	Agriko- Holland
9.	Rudolph	30.08	Late	Agriko- Holland
10.	Zafira	20.08	Middle late	Agriko- Holland
11.	Arizona	20.07	Early	Agriko- Holland
12.	Exelent	30.08	Early	Agriko- Holland
13.	Faluka	30.07-20.08	Average	Agriko- Holland
14.	Ambition	30.08	Early	Agriko- Holland
15.	S2 99 – 4005	30.08	Early	Agriko- Holland
16.	Agata	20.07	Early	Agriko- Holland
17.	Agria	30.08	Early	Agriko- Holland
18.	Markies	30.08	Early	Agriko- Holland
19.	Sinora	30.07	Middle early	Agriko- Holland

3.2. Rudiment

The rudiment rate, as a primary aim of cultivating potatoes, was followed up as a special priority, and outcomes are presented in the table 2.

Tab. 2. Variance analysis and LSD on rudiment, cultivars studied

CULTIVAR (A)	SITE (B)		AVERAGE (A)	
	Peja	Pestova		
Safari	19.80	21.53	20.66	
Triplo	23.80	23.80	23.80	
Belini	23.96	25.90	24.93	
Finka	21.01	21.35	21.18	
Maribel	22.26	23.60	22.93	
Jelly	20.03	21.36	20.70	
Arnova	23.78	24.56	24.17	
Manitov	21.98	23.96	22.97	
Rudolph	24.50	25.06	24.78	
Zafira	26.15	27.18	26.66	
Arizona	24.08	25.66	24.87	
Exelent	23.45	24.33	23.89	
Faluka	22.18	21.56	21.85	
Ambition	23.40	26.06	24.73	
S2 99 - 4005	20.30	22.30	21.30	
Agata	21.93	22.30	22.17	
Agria	21.80	23.63	22.71	
Markies	23.23	25.70	24.46	
Sinora	20.18	20.50	20.34	
Average (B)			INTERACTION	
FACTORS	A	B	A x B	
LSD	1%	3.8397	0.6825	4.3781
	5%	7.3755	0.3482	2.2337

Ns= not significant, *= significant, **= very significant

Tab. 3. Rudiment of cultivars tested, expressed in kg/experimental plot and t/ha

Cultivar	Site	average (kg/two lines)	Average of both sites	Average kg/plant	rudiment (t/ha)
1 Safari	Peja	19.80	20.66	0.99	32.96
	Pestova	21.53		1.07	35.63
2 Triplo	Peja	23.40	23.80	1.17	33.67
	Pestova	23.80		1.19	39.62
3 Belini	Peja	23.96	24.93	1.19	39.62
	Pestova	25.90		1.29	42.95
4 Finka	Peja	21.01	21.18	1.05	34.94
	Pestova	21.35		1.06	35.29

5	Maribel	Peja	22.26	22.93	1.11	36.96
		Pestova	23.60		1.18	39.29
6	Jelly	Peja	20.03	20.70	1.00	33.30
		Pestova	21.36		1.06	35.29
7	Arnova	Peja	23.78	24.17	1.18	39.29
		Pestova	24.56		1.22	40.62
8	Mantiov	Peja	21.98	22.97	1.09	36.29
		Pestova	23.96		1.19	39.62
9	Rudolph	Peja	24.50	24.78	1.22	40.62
		Pestova	25.06		1.25	41.62
10	Zafira	Peja	26.15	26.66	1.30	43.29
		Pestova	27.18		1.35	44.95
11	Arizona	Peja	24.08	24.87	1.20	39.96
		Pestova	25.66		1.28	42.62
12	Exselent	Peja	23.45	23.89	1.17	38.96
		Pestova	24.33		1.21	40.29
13	Faluka	Peja	22.18	21.85	1.10	36.63
		Pestova	21.53		1.07	35.63
14	Ambition	Peja	23.40	24.73	1.17	38.96
		Pestova	26.06		1.30	43.29
15	S2 99-4005	Peja	20.30	21.30	1.01	33.63
		Pestova	22.30		1.11	36.96
16	Agata	Peja	21.93	22.11	1.09	36.29
		Pestova	22.30		1.11	36.96
17	Agria	Peja	21.80	22.71	1.09	36.29
		Pestova	23.63		1.18	39.29
18	Markies	Peja	23.23	24.46	1.22	40.63
		Pestova	25.70		1.28	42.64
19	Sinora	Peja	20.18	20.34	1.00	33.30
		Pestova	20.50		1.02	33.96

The table 3 shows that the rudiment t/ha, the highest rate, was found in cultivar Zafira in both sites Peja (43.29) and Pestova (44.95), while the lowest rate was recorded in cultivar Sinora, also in both research sites, in Peja (33.30) and Pestova (33.96). The rudiment in other cultivars was somewhere in between.

3.3. Dry matter

After harvest and measurement of potatoes in the field, samples were taken on each cultivar, in three series (around 4 kg) to determine dry matter.

Tab. 4. Dry matter in cultivars studied in 2010

No.	Cultivar	Average of 3 series in Peja	Average of 3 series in Pestova	Average of both sites
1.	Safari	12.1	14.7	13.40
2.	Triplo	17.4	16.3	16.85
3.	Belini	16.4	15.2	15.80
4.	Finka	15.7	13.2	14.45
5.	Maribel	13.7	12.4	13.05
6.	Jelly	15.5	12.3	13.90
7.	Arnova	14.4	12.4	13.40
8.	Manitov	15.1	13.1	14.10
9.	Rudolph	14.1	12.4	13.25
10.	Zafira	14.8	12.8	13.80
11.	Arizona	13.4	11.4	12.40
12.	Exelent	18.1	16.7	17.40
13.	Faluka	14.7	14.2	14.45
14.	Ambition	17.2	15.7	16.45
15.	S2 99 - 4005	22.9	18.9	20.90
16.	Agata	11.9	11.2	11.55
17.	Agria	19.6	15.6	17.60
18.	Markies	14.2	13.8	14.00
19.	Sinora	16.4	17.5	16.95

Table 4 shows that the dry matter content was different in different cultivars, and therefore, the lowest value was found in cultivar Agata (11.2 %), and the higher in S2 99 - 4005 (22.9%).

3.4. Baking and disintegration

Baking was undertaken for each cultivar. From the boiling temperature of 100°C the time of baking was measured for each cultivar, and later disintegration was determined.

Results gained in disintegration were classified in three categories: 1, 2 and 3

Tab. 5. Values of disintegration colour of pulp, and tuber colour in cultivars studied.

No.	Code-Cultivar	Disintegration	Skin colour	Pulp colour
1.	Safari	3	White	Yellow
2.	Triplo	1	White	White
3.	Belini	2	Yellow	Yellow
4.	Finka	2	White	White
5.	Maribel	3	Yellow	Light yellow
6.	Jelly	1	White	White
7.	Arnova	2	Yellow	Light yellow

8.	Manitov	2	Red	White
9.	Rudolph	2	Red	Beige
10.	Zafira	3	Yellow	Light yellow
11.	Arizona	3	White	White
12.	Exelent	1	White	White
13.	Faluka	2	Yellow	Light yellow
14.	Ambition	1	Yellow	Dark yellow
15.	S2 99 - 4005	1	White	Yellow
16.	Agata	3	White	Yellow
17.	Agria	1	White	Dark yellow
18.	Markies	2	Yellow	Light yellow
19.	Sinora	1	Yellow	Shiny yellow

4. Conclusions

Based on results obtained in research plots in Dukagjini and Kosovo Plains, we can conclude the following:

- The highest rudiment rate t/ha was found in cultivar Zafira in both sites, Peja (43.29) and Pestova (44.95), and the lowest in cultivar Sinora, again in both sites, in Peja (33.30) and Pestova (33.96).
- From the table above, one can see that the content of dry matter was different in different cultivars, thereby finding the lowest value in cultivar Agata (11.2 %) and the highest in S2 99 - 4005 (22.9 %).
- The highest resistance in unfavourable conditions in vegetation and against diseases were found in cultivars Zafira and Belini.

Bibliography:

1. Borojević, S. 1972. Genetski pristup izgradnje modela visokoprinosnih sorti pšenice. *Genetika*, 4. 1. 105-117.
2. Drezner G., Dvojković K., Novoselović D., Horva Daniela, Guberac V., Marić Sonja i Primorac J. 2006. Utjecaj okoline na najznačajnija kvantitativna svojstva pšenice. *Zbornik Radova*. 41. Hrvatski & Međunarodni Znanstveni Simpozij Agronoma.
3. Kelmendi B., 2007. Studimi i disa linjave të reja të grurit të butë (*Triticum aestivum*) në kushtet e rrafshit të Dukagjinit dhe rrafshit të Kosovës. Disertacion i Doktoraturës. Tiranë.
4. Mladenov N., Mišić T., Pržulj N. i Hristov N. 1998. Year effects on wheat seed quality. International Symposium. Breeding of Small Grains Proceedings. Kragujevac. Yugoslavia.
5. Musa F., Carli C., Jashanica Vjollca, Ramadani S, Kelmendi B 2003. Value for Cultivation and Use of some wheat cultivars in Agroecological Condition of Dukagjini Area. „Kërkime“ Akademia e Shkencave dhe Arteve të Kosovës. Prishinë.
6. Petrović Sofija, Kraljević-Balalić Marija, Dimitrijević M. 1998. Genotype/Environment Interactions and Stability Parameters in Wheat. International Symposium. Breeding of Small Grains Proceedings. Kragujevac. Yugoslavia.

