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Original scientific paper

COMPARISON OF SOME PRODUCTIVE PARAMETERS IN SEVERAL POTATO (SOLANUM TUBEROSUM) CULTIVARS

Alirami SALIJI[1], Valmir SALIJI[2], Hirijete IDRIZI[1], Zejnedije ADEMI[1], Bardhyl LIMANI[1], Bardha IBISHI[3]

[1] Department of Manufacturing Plant, Faculty of Agriculture and Biotechnology, University of Tetova, NMK*
[2] Department of Plant Biotechnology, University "Ss. Cyril and Methodius" NMK
[3]Faculty of Biotechnical sciences, University "Ss. Kliment Ohridski"- Bitola NMK*

Abstract

The comparative study of cultivars is the first step in determining the most suitable cultivar according to climatic and soil conditions. For this purpose, a field experiment was established in the locality of Sellarcë e Epërme–Bogovinë.
The study included the following potato cultivars: Jely, Alluete, Elektra, Ultra, and Lucinda. The parameters analyzed were: plant height, number of tubers per plant, tuber weight, yield per plant, and yield per hectare.
According to the obtained results, significant differences were observed in some of the analyzed parameters, while in others the differences were not statistically significant. Furthermore, for certain genetic parameters, the results corresponded with the characteristics of each cultivar as described by the respective seed producers.
Among the analyzed parameters, the highest plant height was recorded in the cultivar Jely (107.25 cm); the highest number of tubers per plant was found in Lucinda and Elektra (10); the heaviest tubers were observed in Jely (130.25 g); the highest yield per plant was obtained in Lucinda (980 g/plant), while the highest yield per hectare was recorded in Jely (50,525 kg/ha).
The experiment was arranged according to a randomized block design with four replications. All cultivars were planted on the same day and cultivated under identical agronomic conditions. During the vegetation period, biometric measurements were carried out following standard methodology, and data were processed to determine the average values of yield and other biometric indicators.

Keywords: Potato, cultivar, yield, randomized, tuber.

1. Introduction

According to global production statistics, the potato (*Solanum tuberosum* L.) is the fourth most important agricultural crop in the world, after wheat, maize, and rice (Zgórska, 2008). However, in terms of direct human consumption, it ranks third, following wheat and rice. Worldwide potato production exceeds 374,000,000 tons (FAOSTAT, 2013).
On average, potato tubers contain 76.3% water, 17.5% starch, 2.0% protein, 0.1% fat, 1.1% ash, and 0.7% crude fiber. Potato tubers are also rich in amino acids such as tryptophan, lysine, valine, and methionine, which are essential for the human body. The skin and bulbs of the potato contain a specific compound known as solanine (Egumenovski et al., 1998).
In addition to its nutritional value, the potato is also considered an important crop from an agrotechnical perspective, as it serves as an excellent preceding crop for many other agricultural plants. Being a row crop that requires intensive soil cultivation and fertilization, it leaves the soil loose and enriched with mineral substances (Egumenovski, 1998).
In 2010, at the global level, potatoes were cultivated on an area of 19,083,575 hectares, with a total production of 324,420,782 tons and an average yield of 17.0 t/ha (Eurostat, 2012). In North Macedonia, potatoes are cultivated on approximately 13,000 hectares, with a trend of continuous increase and an average yield slightly above 13 t/ha (Statistical Yearbook of the Republic of Macedonia, 2013).

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2. Research Objective

The objective of this study was to investigate the factors determining the relatively low average potato yield at the national level, with special emphasis on identifying the potato cultivar with the highest genetic potential and productivity under the agroecological conditions of the Polog region.

3. Materials and Methods

For this purpose, a field experiment was established in the locality of Sellarcë e Epërme–Bogovinë, in the Polog region, during the 2023 growing season.
Planting was carried out on March 23, 2023. The study included the following potato cultivars: Jely, Alluete, Elektra, Ultra, and Lucinda. The parameters analyzed were: plant height (cm), number of tubers per plant (no.), tuber weight (g), yield per plant (g), and yield per hectare (kg).
The experimental design followed a randomized block layout with four replications for each treatment, and the experimental plot size was 21 m².

4. Results and Discussion

The obtained results were analyzed separately for each parameter. For some parameters, significant differences were observed among the cultivars included in the experiment, while for others, although numerical differences were recorded, they were not statistically significant.
Plant height — From Table 1, it can be observed that plant height ranged from 94.25 cm in the cultivar *Alluete* to 107.25 cm in the cultivar *Jely*. According to the obtained results, a statistically significant difference in plant height was found between the cultivar *Jely* and the cultivars *Lucinda* and *Alluete*. However, no significant difference was observed between *Jely* and the cultivars *Elektra* and *Ultra*.

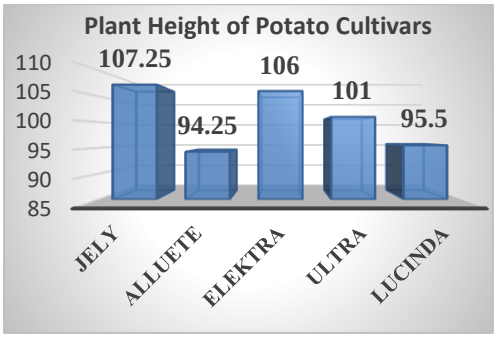

Table 1 – Plant Height of Potato Cultivars

Cultivar	Rep. I	Rep. II	Rep. III	Rep. IV	Mean (cm)
Jely	110	103	106	110	107.25
Alluete	95	96	97	89	94.25
Elektra	108	104	106	106	106.00
Ultra	104	102	98	100	101.00
Lucinda	96	95	94	97	95.50

Number of tubers per plant — From Table 2, it can be observed that the number of tubers per plant ranged from 8 in the cultivar *Alluete* to 10 in the cultivars *Elektra* and *Lucinda*. According to the obtained results, no statistically significant differences were observed in the number of tubers per plant among the studied cultivars.

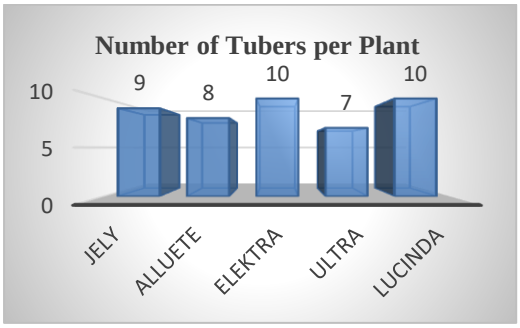

Table 2 – Number of Tubers per Plant

Cultivar	Rep. I	Rep. II	Rep. III	Rep. IV	Mean (no.)
Jely	8	10	8	10	9.0
Alluete	8	7	9	8	8.0
Elektra	10	10	12	8	10.0
Ultra	6	8	6	8	7.0
Lucinda	10	10	8	12	10.0

Tuber weight — From Table 3, it can be observed that the highest average tuber weight was recorded in the cultivar *Jely* (130.25 g), while the lowest was observed in *Elektra* (94.5 g). Statistically significant differences were found between the cultivars *Jely* and *Ultra* compared to *Alluete*, *Elektra*, and *Lucinda*.

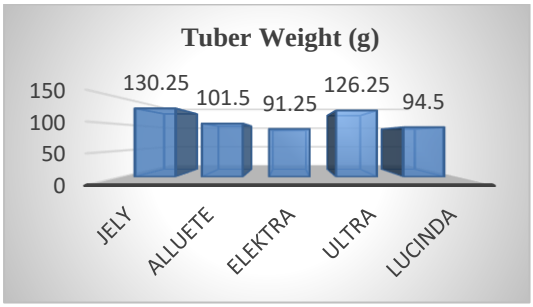

Table 3 – Tuber Weight (g)

Cultivar	Rep. I	Rep. II	Rep. III	Rep. IV	Mean (g)
Jely	120	124	135	142	130.25
Alluete	105	110	95	96	101.50
Elektra	94	89	87	95	91.25
Ultra	110	130	145	120	126.25
Lucinda	98	86	98	96	94.50

Yield per plant — From Table 4, it can be observed that yield per plant ranged from 808.25 g/plant in the cultivar *Alluete* to 1175 g/plant in the cultivar *Jely*. The obtained results indicate statistically significant differences between the cultivar *Jely* and the other cultivars included in the study.

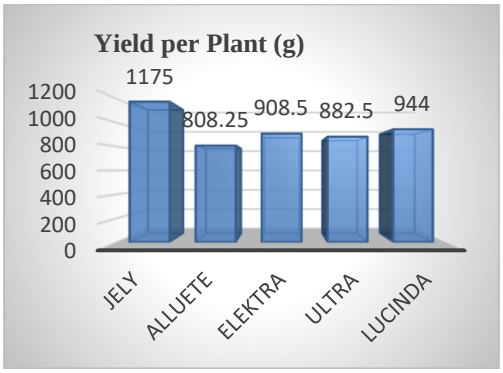

Table 4 – Yield per Plant (g)

Cultivar	Rep. I	Rep. II	Rep. III	Rep. IV	Mean (g)
Jely	960	1240	1080	1420	1175.00
Alluete	840	770	855	768	808.25
Elektra	940	890	1044	760	908.50
Ultra	660	1040	870	960	882.50
Lucinda	980	860	784	1152	944.00

Yield per hectare — From Table 5, it can be observed that yield per hectare ranged from 34,744 kg/ha in the cultivar *Alluete* to 50,525 kg/ha in the cultivar *Jely*. Statistically significant differences in yield were recorded between the cultivars *Jely* and *Alluete* and *Ultra*, while smaller, non-significant differences were observed among the other cultivars.

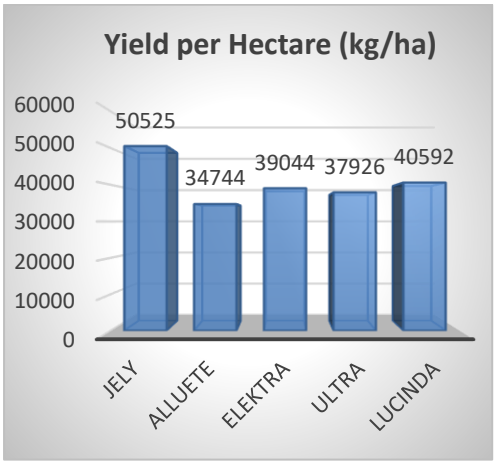

Table 5 – Yield per Hectare (kg/ha)

Cultivar	Tuber Weight per Plant (kg)	Number of Plants per ha	Yield (kg/ha)
Jely	1.175	43,000	50,525
Alluete	0.808	43,000	34,744
Elektra	0.908	43,000	39,044
Ultra	0.882	43,000	37,926
Lucinda	0.944	43,000	40,592

5. Conclusions

Based on the obtained results for plant height in potatoes, it was observed that in the variety *Desiree* there was no significance at any level or in any variant. In the variety *Condor*, significance at the 0.05 level was recorded in variant H1, while at the 0.01 level it appeared in variants H2 and H3. In the variety *Ultra*, significance was observed in variant H1 at the 0.05 level. In the variety *Karlita*, significance was found in variant H1 at both levels, whereas in the variety *Arnova* no significance was detected at either level.
Based on the results obtained for the number of tubers per plant, it can be concluded that there was no significant difference in any variant or cultivar at either level.

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