

EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF POTATO CULTIVARS (*SOLANUM TUBEROSUM L.*)

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ABSTRACT

The potato (*Solanum tuberosum L.*) is an annual plant of the *Solanaceae* family spread all over the world. This is due to the adaptability of the plant, and the variability of potato cultivars in terms of: plant period, and biological and technological adaptability. It is cultivated at all altitudes above sea level, from the coastal area as an early potato to the high areas as a late potato. The genetic study, the creation of new cultivars with higher biological productive capacity, with higher resistance to viral, bacterial, and fungal diseases has constantly been the object of the research and scientific work of Research Institutes for potato all over the world and especially in the Netherlands and which has not only the highest yield in the world, but produces the elite potato seed. The creation of new cultivars is constantly in scientific work and seed production. Ecological and productive degeneration in potato is a frequent occurrence, significantly reducing potato yield. Therefore, the creation of new cultivars and their testing in different countries is coherent. Eleven potato cultivars obtained from the Netherlands, France, and Germany were included in the study, specifically: Jaerla, Agria, Mandola, Bjodina, Universi, Malou, Loane, Melene, Amany, Big Rose, and Flower Blu.

In these cultivars, biometric measurements were made for: plant height, number of shoots per plant, production per plant, vegetative period, average tuber weight and yield (kv).

Keywords: Potato, genetic, tuber, cultivar, yield, sprout.

INTRODUCTION

This study aims not only to evaluate potato cultivars in general but also to highlight all the indicators of a cultivar in particular and in detail, relying on the experience of studies of developed countries, which receive high yields in the culture of potatoes such as the Netherlands, Germany, France, etc. The identification of the vegetative period, the shape of the tuber, the color of the skin, the color of the pulp as well as many other positive indicators opens new perspectives.

MATERIALS AND METHODS

The aim of the study: The study of potato cultivars to determine the best cultivar for the agroecological and soil conditions of Lushnja. To achieve the goal of this scientific study, the experiment was set up and the following indicators were evaluated: plant height, number of shoots/plant, yield/plant, number of tubers/plant, tubers with the greatest weigh, as well as yield in % by tuber weight.

The field experiment was carried out during the period February - May 2021, in Zhama of Lushnja. Eleven cultivars were included in the study:

- | | | | |
|------------|-------------|-----------|----------------|
| 1. Jaerla | 4. Bjodina | 7. Loane | 10. Big Rose |
| 2. Agria | 5. Universi | 8. Melene | 11. Flower Blu |
| 3. Mandola | 6. Malou | 9. Amany | |

Morphological indicators

1. Plant height.
2. Number of shoots per plant.

Biological indicators

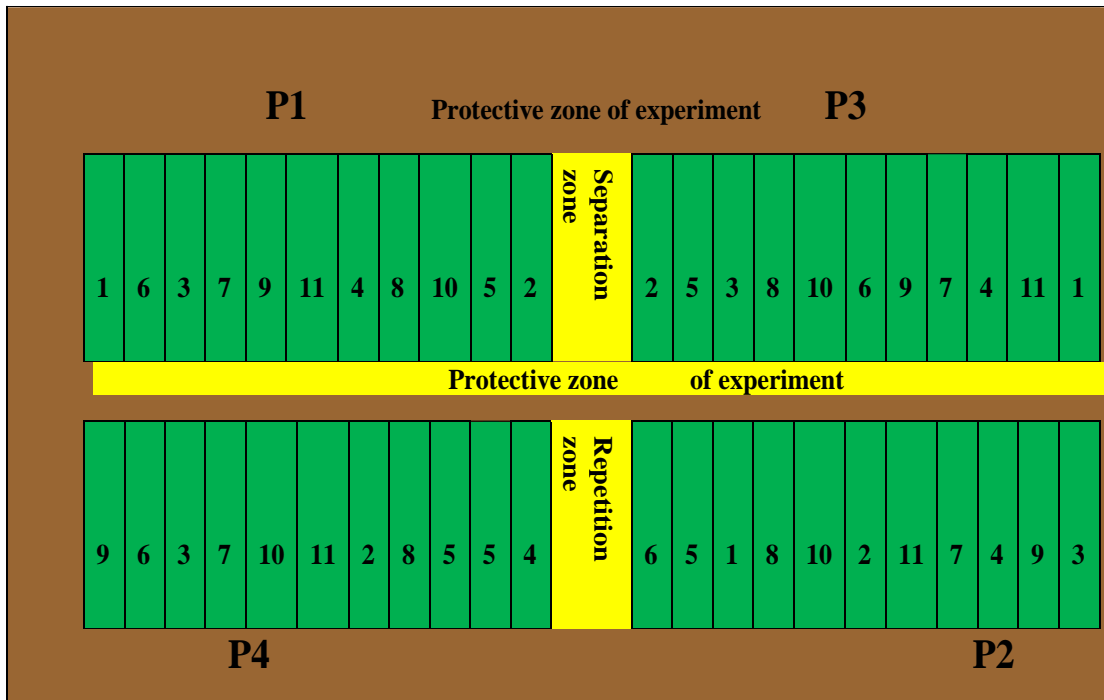
1. Vegetative period (sowing - harvesting and germination - harvesting)

Production indicators

1. Production/plant
2. The realized yield kv/ha.

Methods of analyzing parameters

For each variation and repetition, 10 plants were predetermined, on which the biometric measurements and the corresponding calculations for the predicted indicators were made according to the scientific method.



Scheme No. 2. Setting up the experiment

Basic data for the planned experiment

Experimental Design System: Randomized Complete Blocks.

The location of the experiment: in Zhamë - Lushnjë.

Number of repetitions (blocks): four (4).

Number of rows / repetitions: four (4)
 The Row length: 5.0 m.
 Tuber planting distance: 70 x 25 cm, providing 59 000 plants/ha.
 Separation distance between the blocks from all sides: 2 m.
 Ranking of cultivars for each replicate: the random method.
 Number of tubers per plot (variant): 60 tubers.
 Planting tubers: by hand.

Applied agrotechnics

The agrotechnical measures during the one-year study as well as the care measures were almost the same: the basic tillage was 31-35 cm, pre-planting is wheat, the milling process before planting, basic fertilization 300 kv/ha organic manure, 4 kv/ha superphosphate, 1.2 kv/ha urea and 1.5 kv/ha potassium sulfate before planting. Planting was carried out on February 13, 2021, and vegetation care was carried out. The soil was disinfected with Drusban to combat soil pests.

3. Results and their interpretation

The height of the plant

The height of the plant is a special characteristic that affects the potato yield. Height 55 – 70 cm is the most desirable height and with the highest effectiveness in potato yield.

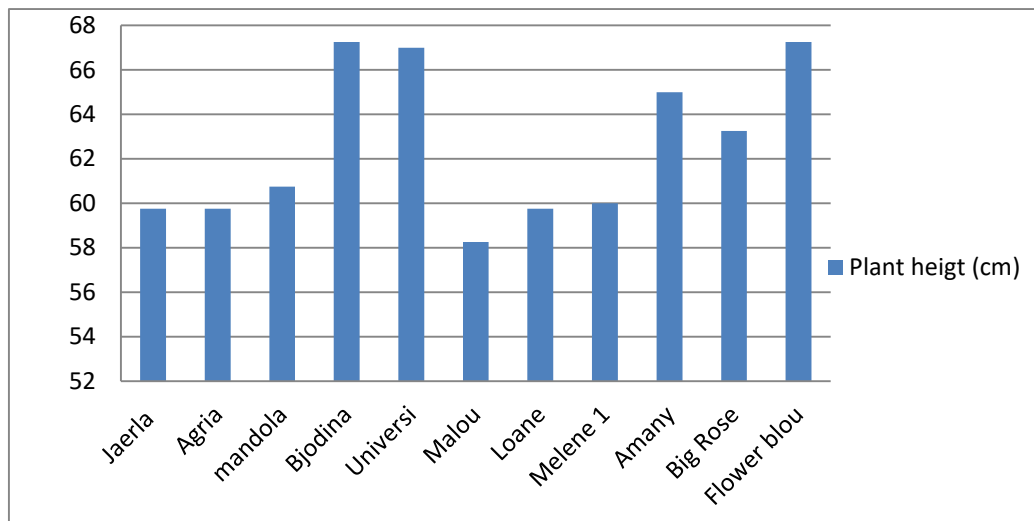


Chart No. 1 Plant height (cm).

In the eleven cultivars included in the field experiment, the plant height is 58.25 - 67.25 cm, height within the recommended limits for potato cultivars. The cultivars: Malou, Jaerla, Agria and Loane have the lowest height and the cultivars: Bjodina, Universi and Flower Blou have the highest height.

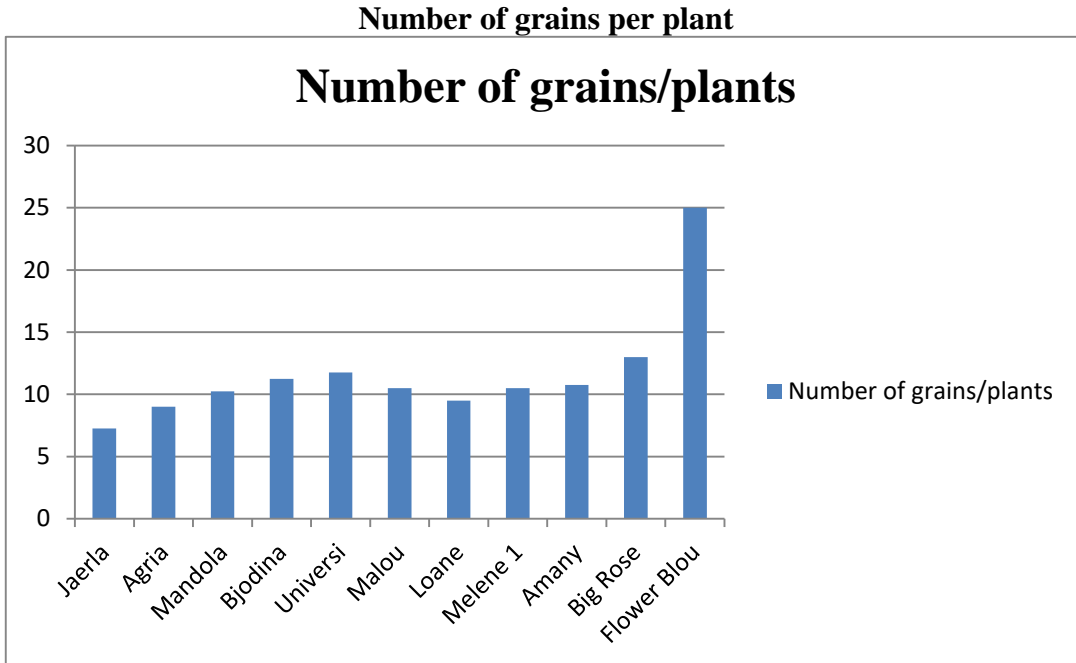


Chart No. 2 Number of grains per plant

The number of grains per plant varies between cultivars. The Flower Blou cultivar has a higher number of grains, approximately two to three times more than the other cultivars.

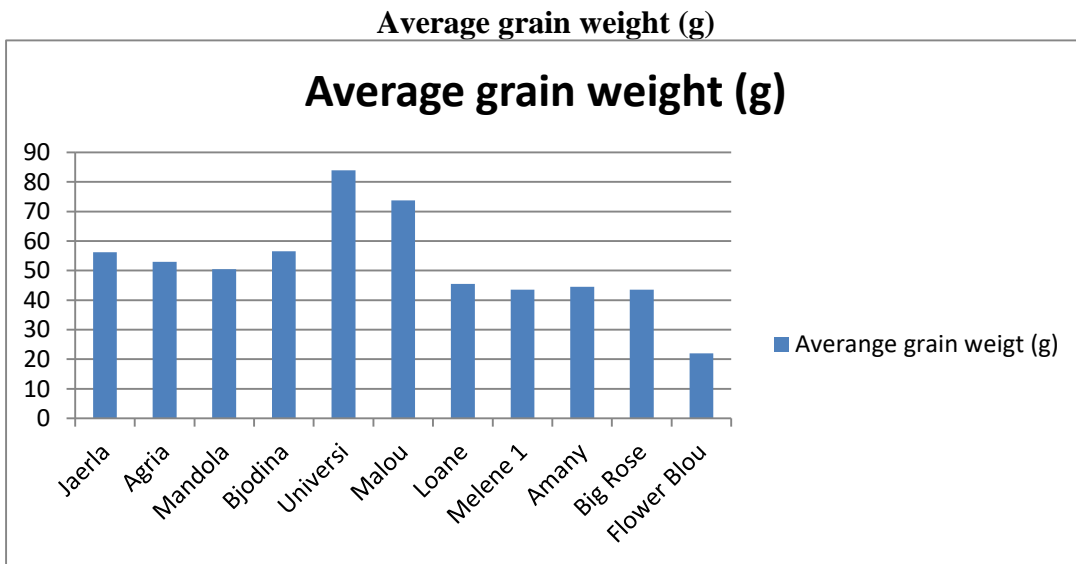


Chart No. 3 Average grain weight (g)

Average grain weight appears to be different between cultivars. Cultivars are divided into five groups:

A. The first group of cultivars that have tubers with an average weight of over 80 g, which includes the Universal cultivar.

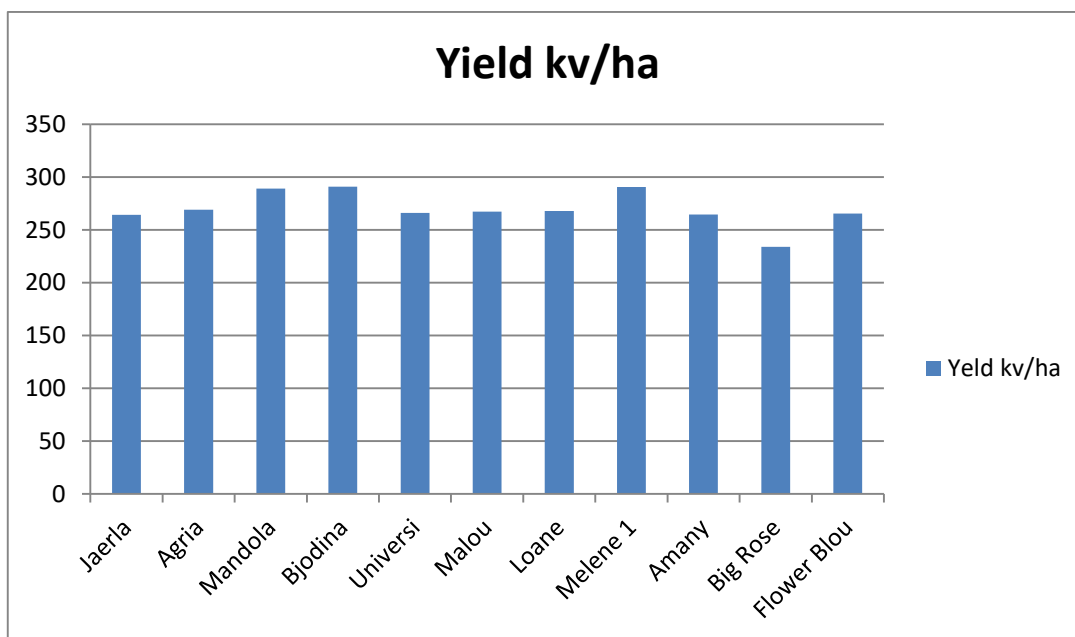
B. Cultivars with tubers with an average weight of 70 – 80 g, including the Malon cultivar.

C. Cultivars with an average tuber weight of 50 - 60 g, including the cultivars: Jaerla, Agria, Mandola, Bjodina

D. Cultivars with an average tuber weight of 40 – 50 g, including the cultivars: Loane, Melene and Big Rose.

E. Cultivars with an average tuber weight of 30 – 40 g, including the cultivar Flower Blou which has the lowest tuber weight with an average weight of 22 g. This cultivar presents interest for its taste and is liked by the market.

3. 2.5. Yield kv/ha



Graph No. 4 Yield kv/ha

Although the climate of 2021 was not suitable for potato in the coastal lowland area, higher yields were achieved in the potato experiment than the extensive production in Divjaka, and the harvest was made about 25 days later than in other years. According to yield, cultivars are divided into four groups:

A. Cultivars with a yield above 290 kv/ha, including the cultivar: Bjodina, e Melene.

B. Cultivars with a yield of 280 – 290 kv/ha: including the Mandola cultivar.

C. Cultivars with a yield of 270-280 kv/ha, including the cultivars: Jaerla, Agria, Universi, Malon, Loane, Flower Blou and Amany.

D. Cultivars yielding less than 270 kv/ha, including the cultivar: Big Rose.

In the conditions of the experiment, they have manifested a vegetation period similar to the data described by the company.

Cultivars differ in tuber characteristics and especially in bud placement. The placement of buds is a feature that is highly valued in the kitchen.

The depth of placement of the buds is decisive for the industrialization of tuber processing, the tuber utilization coefficient (% of utilization).

Production indicators

No.	Cultivars	Production by weight of tubers (in %)			
		Till 30 g	31 – 80 g	81 - 120 g	Over 120 g
1	Jaerla	8.2	25	33.8	33
2	Agria	9	23	31.8	36.2
3	Mandola	11	25.4	29.6	34
4	Bjodina	9.5	23.8	30.9	36
5	Universi	9.8	24.6	34.8	30.8
6	Malou	8.7	23	33.8	34.5
7	Loane	8.9	22	38.1	30
8	Melene 1	7.9	24.5	33.4	34
9	Amany	8.8	22.5	29.2	38.9
10	Big Rose	9.8	20.8	57.4	12
11	Flower Blu	89	11	-----	-----

Table No. 1

Cultivars vary a lot in tuber weight. With greater weight are: Agria and Big Rose.

The number of shoots

The number of shoots is an indicator related to potato production. It is often evaluated as a determinant for the number of tubers/plant and production/plant. From the analysis of the data of the cultivars studied, differences between them are presented, for the indicator of the number of shoots.

Cultivars: Flower Blou, Melen 1, Bjodina, and Universi have the highest number of shoots.

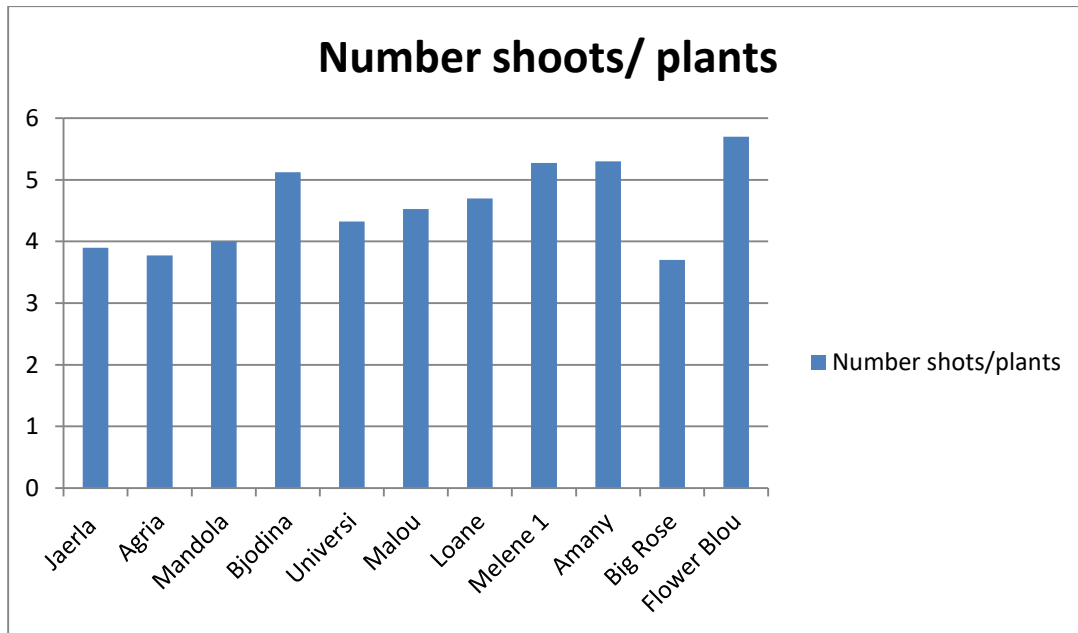
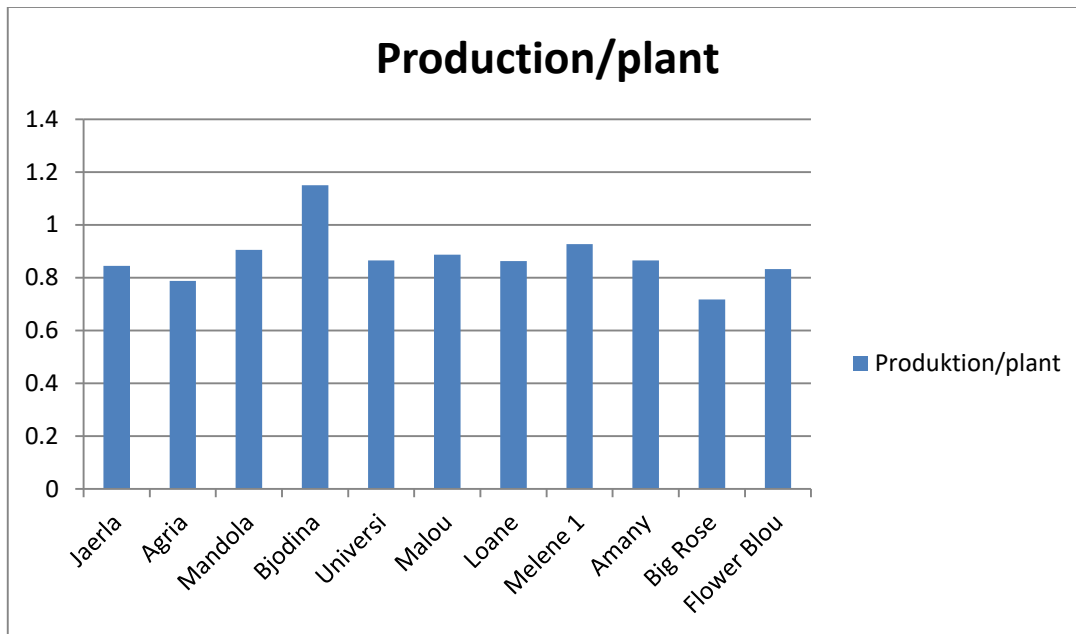


Chart No. 5 Number of shoots/plant

Average production/plant



Graph No. 6 Production/plant (kg)

The production per plant has differences between the cultivars where the Bjodina cultivar stands out with the highest production weight per plant and the Big Rose cultivar has the lowest.

CONCLUSIONS AND RECOMMENDATIONS

Based on the observations, the evaluation of the biological, morphological, production and quality indicators of the potato cultivars that we had in the study, as well as after the interpretation of the data of the conducted experiments, we draw some conclusions:

A. Conclusions

From the data analysis of morphobiological and productive indicators, we can draw some conclusions, among which we are mentioning the most important ones:

1. Cultivars do not vary greatly in plant height, being included in medium height cultivars.
2. Cultivars do not have big differences from the vegetative period, they differ very little in the passage of phenological phases, only by 5-7 days.
3. Cultivars do not vary greatly in yield per plant, settling on cultivars with high-weight Bjodina, and lower-weight Big Rose.
4. Cultivars do not have big differences in the number of shoots per plant, being placed in the cultivars with the highest number of shoots Flower Blou, Amany, Bjodina and Melene 1 and with the lowest number of shoots the cultivar Big Rose.
5. Cultivars vary greatly in tuber weight; the Agria cultivar has the highest tuber weight and the Big Rose cultivar has the lowest weight.
6. Cultivars vary greatly in yield; Bjodina, Mandola, Melene 1 are placed in the cultivars with the highest yield, and the cultivar with the lowest yield is Big Rose.

B. Recommendations

From the general analysis of the morphobiological indicators, and especially the analysis of the yield, we advise to plant in this area the cultivars: Bjodina and Melene, which have given a higher yield and have not been affected by diseases.

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