

EVALUATION OF MORPHOBIOLOGICAL AND PRODUCTIVE INDICATORS OF POTATO CULTIVARS (*Solanum tuberosum l.*) IN THE AREA OF MYZEQE, LUSHNJE

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Abstract

The potato is spread all over the world, being planted in plain, hilly, sub-mountain, and mountain areas. In Albania, 10,000 to 14,000 ha of early, medium, and late potatoes are planted. In recent years, the yield of potatoes in large-scale production has increased for two reasons: First, it is planted in more productive soils and under irrigated conditions, so there are improvements in cultivation. Secondly, new cultivars with higher biological productive capacity have been introduced into cultivation. The study of morphobiological and productive indicators of potato cultivars is ongoing to achieve high and sustainable yields.

This also includes the study carried out in Zhama, Lushnje, in which eleven cultivars were included, specifically: La Perla, Valencia, Aleksjo, Gaya 1, Amora, Gaya 2, Juveli, Fidel, Solo, Zisi and Melene 2. The experiment was set up on light soils according to a randomized block design with eleven variants and four replications. Planting was done with the workforce in two days, on February 8 and 9, 2023. During the vegetation, ten plants for each variant and repetition were determined on which biometric and production measurements were made, such as Plant height, number of shoots per plant, production per plant, number of grains per plant, production in percentage by weight; up to 30 g, 31 - 80 g, 81 - 120 g and over 120 g. The data was processed to determine the best cultivar.

Keywords: Potato, shoot, cultivar, plant, yield, experiment, variant.

Introduction

Potato is one of the plants that is grown in every corner of the globe. In Albania, it is planted in all ecological zones. The study of evaluation of potato cultivars is a major field since potato seed is imported and we must ensure their adaptation in the ecological zones of Albania.

Material and methods

The aim of the study

The study of potato cultivars with the aim of determining the best cultivar for the agroecological and soil conditions of Lushnje. For the realization of the purpose and objectives of this scientific study, the experiment was set up, the following indicators were evaluated:

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. Also, through the study and the used literature, the evaluation of the indicators in particular and the connection between them as well as the influence between the production indicators based on statistical processing is carried out. Evidence 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 that open new perspectives. The study of dry matter content made possible the separation and suitability of cultivars for consumption and industrial processing.

Material and scientific methods

The field experiments were carried out during the period February - May 2023, in Zhama of Lushnja:

Experiment: Study of morphological and productive indicators of potato cultivars.

Sixteen cultivars were included in the study:

In field studies, biological, morphological, and productive indicators of cultivars are evaluated. Cultivars included in the study:

1. La Perla 2. Valencia 3. Aleksjo 4. Gaya 1 5. Amora 6. Gaya 2 7. Juveli 8. Fidel 9. Solo 10. Zisi 11. Melone 2

Morphological indicators

- 1- The height of the plant.
- 2- The number of shoots per plant.

Biological indicators

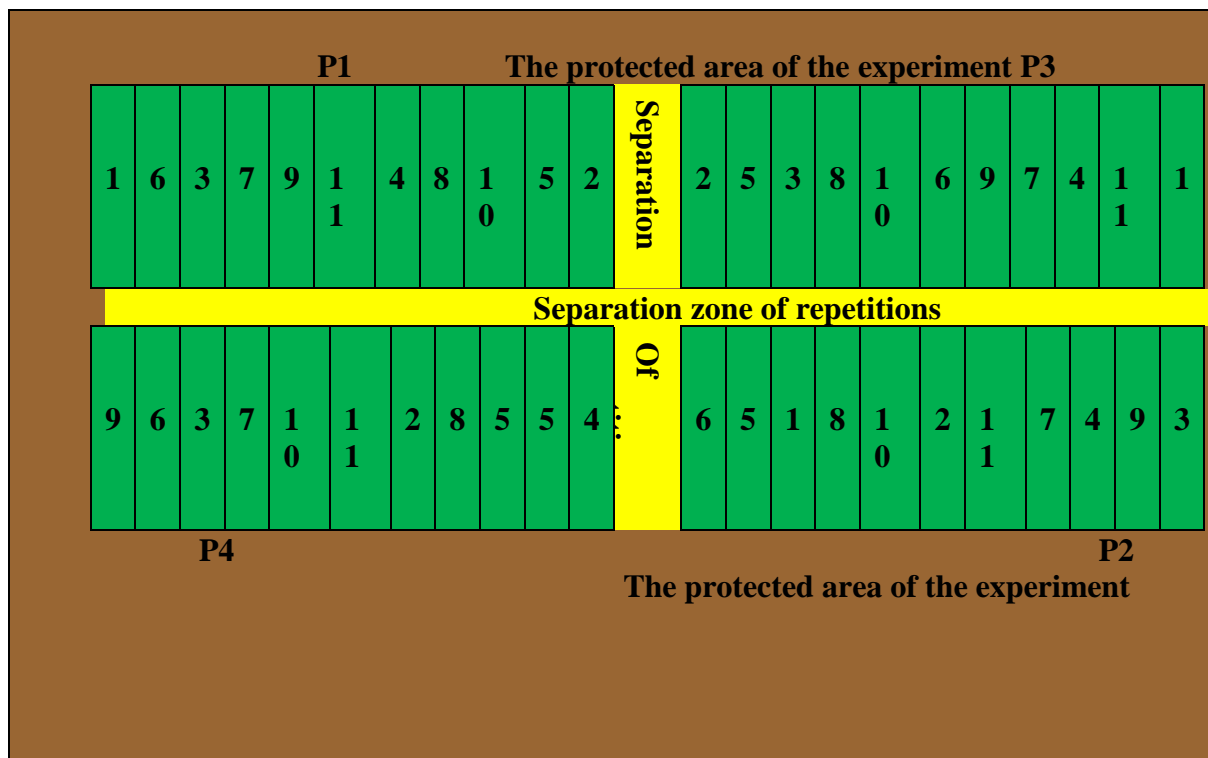
- 1- Vegetative period (sowing - harvesting and germination - harvesting)
- 2- The color of the flower
- 3- The color of the pulp
- 4- The color of the skin

Production indicators

- 1- Production/plant
- 2- Yield kv/ha

Methods of analyzing parameters

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



Scheme 2. Setting up the experiment

Basic data for the planned experiment

Experiment setting system: Fisher's complete randomized (randomized) blocks, Experiment setting site, in Zhamë - Lushnjë, the soil was rented for 200 Euros.

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

Row length: 5.0 m.

Tuber planting distance: 70 x 25 cm, providing 59 000 plants/ha.

The separation distance between the blocks from all sides: is 2 m.

Ranking of cultivars for each replicate: the random method.

Planting tubers: by hand

Agrotechnical measures

The agrotechnical measures during the three-year study as well as the care measures were almost the same:

Basic tillage:

Pre-plant: wheat

Milling: Before planting,

Basic fertilization: With NPK: before planting

Planting: on February 8

Results and their discussion

The soil in which the experiment was set up was analyzed and the indicators are: water pH 6.95, saline pH 6.7, K.E. 0.100, Humus 2.2 %, Nitrogen 0.14 %, Phosphorus ppm 11.6, Potassium ppm 13.27, CaCO₃ 1.64 %, sand 36.6 %, silt 31.3 % and clay 32.1 %. They are suitable soils for potato cultivation.

The study of morphological and productive indicators of some potato cultivars

Cultivars, with different vegetative periods, and different genetic origins are included in the study. The study was carried out in Zhama of Lushnja.

The cultivars included in the study originated from known parent material and from the Netherlands Company. Their genetic origin is different in many morphobiological and production indicators. The color of the flower is characteristic of the potato cultivars and does not change. It serves to identify potato cultivars in the field at the flowering stage. In the cultivars included in the study, the flower is white in all cultivars. Morphological indicators are of interest because their level determines production/plant and yield.

Plant height

The first indicator to be studied is the height of the plant. In many cases the height of the plant has a direct correlation with the yield.

The height of the plant is a special characteristic that affects the potato yield. The height of 55-70 cm is the most desirable height and with the highest effectiveness in potato yield. In the eleven cultivars included in the field experiment, the plant height is 59.75 - 77.5 cm, height within the recommended limits for potato cultivars. The cultivars Zisi, La Perla, and Aleksjo have the lowest height, and the cultivars: Juveli, Valencia, and Melone 2 have the highest height.

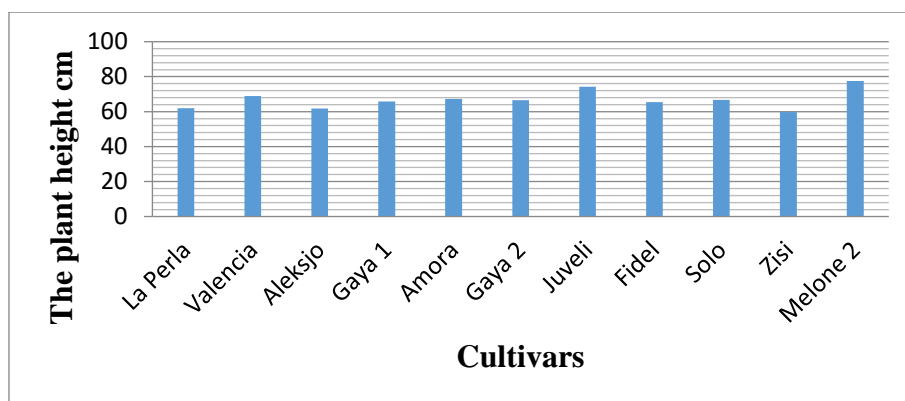


Chart 1 Plant height in cm

As can be seen from the graph, the cultivars: Juveli e Melone 2 have the highest height, while the other cultivars have similar and shorter heights.

Number of grains/ plant

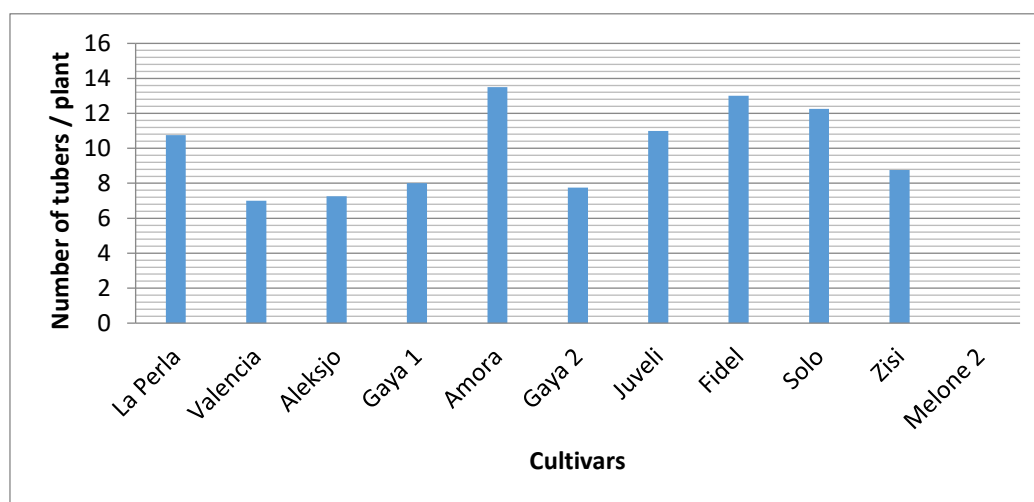
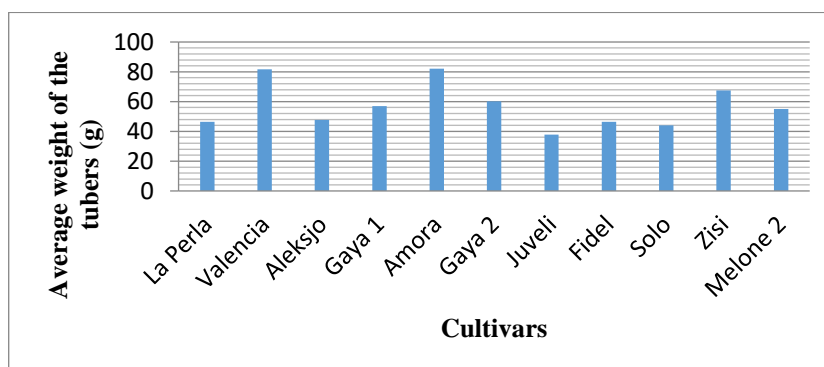


Chart 2 Number of tubers/plant

Cultivars: Amora, Fidel, Solo, Juveli and La Perla have the highest number of tubers/plant, and cultivars: Valencia, Aleksjo, Gaya 1, and Gaya 2 have the lowest number.

The average weight of the tuber (g)



Graph 3 Average weight of the tuber (g)

Cultivars that have tubers with the highest weight are: Valencia, Amora, and Zisi and the cultivars Juveli and Solo have the lowest weight. Average tubers weight appears to be different between cultivars. Cultivars are divided into three groups:

- A. The first group that have tubers with an average weight of more than 80 g, where they are included cultivars: Valencia, Amora and Zisi.
- B. Cultivars with tubers with an average weight of 70-80 g, which includes the cultivars: Gaya 1, Gaya 2, and Melone 2.
- C. Cultivars with an average tuber weight of 50-60 g, including the cultivars: La Perla, Aleksjo, Juveli, Fidel, and Solo.

Production indicators

Cultivars vary a lot in tuber weight. Cultivars with the greatest weight are Valencia, Solo, Amoro, and Gaya 1. In the second group are the cultivars: La Perla, Aleksjo, Gaya 2, and Fidel. In the third group are the cultivars: Zisi and Melone 2.

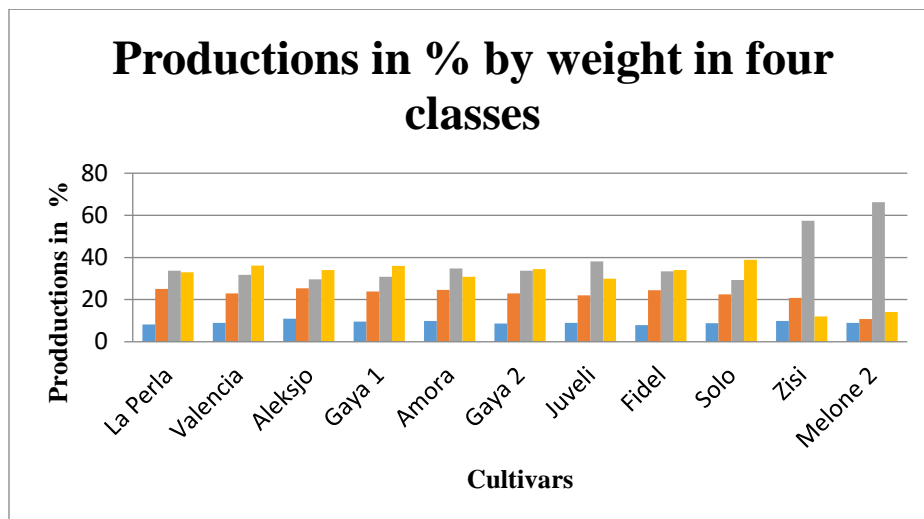
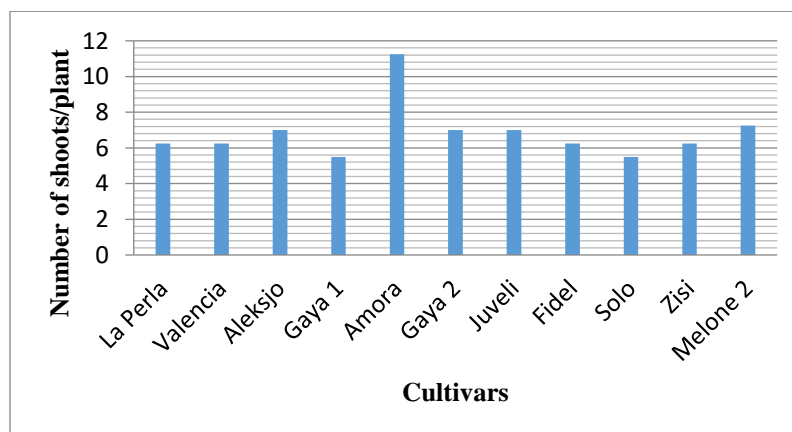


Chart 4 Production in % by weight: 1. Up to 30 g. 2. 31-80 g. 3. 81-120 g. 4. Over 120 g.

The number of shoots

The number of shoots is an indicator related to potato production. It is often evaluated as a determinant of 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. Cultivar Amora has the highest number of shoots and all other cultivars have the lowest number of shoots.



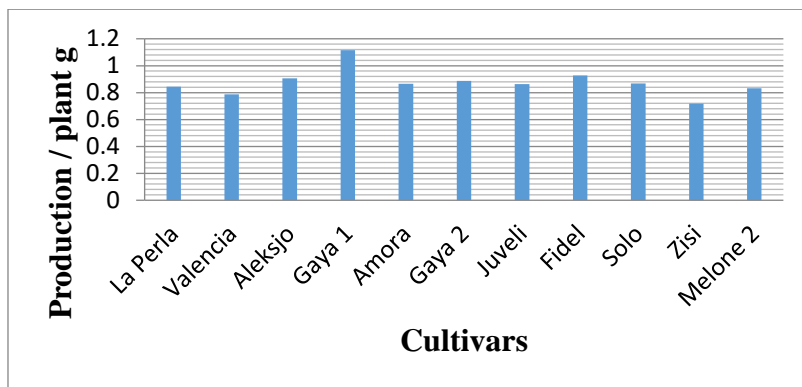
Graph 5 Number of shoots/plant

The number of shoots/plant is different among cultivars forming four groups:

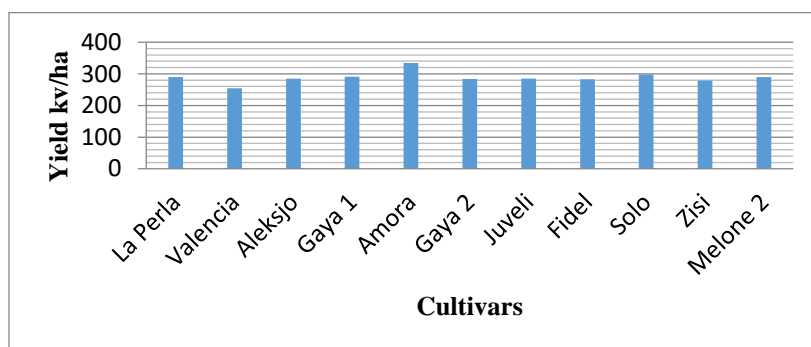
- 1- The first group that has the highest number of shoots is represented by the cultivar Amora.
- 2- The second group with a smaller number of shoots is represented by the cultivars: Aleksjo, Gaya 2, Juveli, and Melone 2.
- 3- The third group is represented by the cultivars: Zisi, Fidel, Valencia, and La Perla
- 4- The fourth group that has a very low number of shoots is represented by the cultivars: Gaya 1 and Solo.

Average production/plant

The production per plant has differences between the cultivars where the cultivars Gaya 1 Aleksjo and Fidel have the highest weight of production per plant and the cultivars: Zisi and Valencia have the lowest weight.



Graph 6 Production per plant in g. Yield kv/ha



Graph 7. Yield kv/ha

Although the climate of 2023 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 done about 15 days later than in other years. According to yield, cultivars are divided into four groups:

- A. Cultivars with a yield above 300 kv/ha, including the cultivar: Amoro.
- B. Cultivars with a yield of 290 - 300 kv/ha: which includes the cultivars: Solo, Gya 1, and Melone 2.
- C. Cultivars with a yield of 280-290 kv/ha include the cultivars: La Perla, Aleksjo, Gaya 2, Juveli, and Fidel.
- D. Cultivars with a yield below 280 kv/ha include the cultivar: Valencia and Zisi.

Cultivars have obvious differences in the growing season and are divided into main groups. In the conditions of the experiment, they have manifested a vegetation period similar to their data described by the company. Cultivars differ in characteristics 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 a determinant for the industrialization of tuber processing, the tuber utilization coefficient (% utilization).

Cultivars with deep buds are Zisi, Melone 2, and Aleksjo.

Cultivars with shallow buds are Solo, Gaya 2, Valencia, and La Perla.

Cultivars that have surface buds are Fidel, Juveli, Amora and Gaya 1.

Conclusions and recommendations

A. Conclusions

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

1. Cultivars do not present changes in flower color.
2. Cultivars do not vary greatly in plant height, being included in medium-height cultivars.

Cultivars do not have big changes from the vegetative period, they change very little in passing the phenological phases, only by 5-7 days.

3. Cultivars do not have major changes from production to plant, entering the high-weight cultivars: Melone 2 and Amora.
4. Cultivars vary greatly in yield, with the highest-yielding cultivars being introduced: Gaya 1 and Solo.

B. Recommendations

From the general analysis of the morphobiological indicators, and especially of the yield, we advise to plant in this area the cultivars: Gaya 1 and Solo, which have given a higher yield and have not been affected by diseases.

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