

DETERMINATION OF PLANT HEIGHT AND NUMBER OF TUBERS PER PLANT OF SOME POTATO CULTIVARS IN THE POLOG REGION

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ABSTRACT

The purpose of the experiment was to investigate the impact of different herbicides on the height of the potato plant as well as on the number of tubers per plant. In field conditions, five potato cultivars were investigated: Desire, Kondor, Ultra, Carlita, and Arnova, as well as six different variants of herbicides: absolute control, mechanical control, pendimethalin, linuron, metribuzin PRE, and metribuzin POST. The experimental scheme was a randomized block with three replications for each variant with experimental plot sizes of 21 m². The experiment was carried out in the vegetative year 2020 in the locality of Gorno Sedlarce, Tetovo.

Based on the obtained results, the following was established: Cultivar Desire reached the highest height in the H4 variant, also 59.4 cm, while the lowest height in the H1 variant was 57.8 cm, Kondor in the H2 variant was also 66.2 cm while lower in the H4 variant 62.0 cm, Ultra in the H3 variant also 79.4 cm while lower in the H1 variant 73.3 cm, Carlita in the H2 variant 54.2 cm while lower in the H3 variant 62.6 cm, Arnova in the H3 variant 62.1 cm while the lowest in the H1 variant 56.4 cm or on average all types of potatoes reached the highest height in the H3 variant 65.5 cm while the smallest in the H1 variant was also 62.4 cm.

As for the number of tubers per plant of the obtained results, the following was found: Cultivar Desire, the highest number of tubers was reached in the H3 variant (10.3), while the smallest number was in the H2 variant (9.0). , Kondor the highest number of tubers reached the H4 variant (10.0) while the smallest number reached the H3 variant (8.7), Ultra the highest number of tubers reached the H2 variant (8.7), while the smallest number in the H3 variant (7.0), Carlita, the largest number of tubers reached the H2 and H4 variants (10.0), while the smallest number in the H3 variant (9.0), Arnova number the largest number of tubers has reached the H2 variant (10.7) while the smallest number has reached the H4 variant (9.0) or on average all types of potatoes the largest number of tubers has reached the H2 variant (9.5) while a smaller number in the H3 variant (9.1).

Keywords: potato, cultivar, variant, significance.

INTRODUCTION

Potato (*Solanum tuberosum* L.) is an important agricultural crop that is cultivated in 125 countries of the world and consumed by 1 billion people (Lutaladio et al., 2009).

According to world production, potato is the fourth agricultural crop after wheat, corn, and rice (Zgórska, 2008), while according to the use for human food, it is the third crop after wheat and rice. At the world level, potatoes exceed the production of 374 000 000 tons (FAOSTAT, 2013). The Andes mountain massifs in South America, specifically the states of Peru and Chile, are considered the center of origin of the potato (Kostov, 2003). Potato tubers on average contain 76.3% water, 17.5% starch, 2.0% protein, 0.1% fat, 1.1% ash, and 0.7% fibrous matter. Potato

tubers are also rich in amino acids such as (tryptophan, lysine, valine, methionine, etc.), very important for the human body. Potato skins and bulbs contain a specific substance known as solanine. (Egumenovski et al. 1998). In addition to its nutritional value, the potato is also a very important crop from an agrotechnical point of view because it is a very important pre-crop for many other agricultural crops. As a pollinating crop that feeds abundantly, it leaves the soil loose and rich in mineral matter (Egumenovski 1998). In 2010, worldwide, potatoes were cultivated in an area of 19,083,575 ha with a production of 324,420,782 tons and an average yield of 17.0 t/ha (Eurostat, 2012). In Macedonia, potatoes are cultivated on an area of 13,000 ha with a tendency for continuous growth and with an average yield of something over 13 t/ha. (Statistical Yearbook of the Republic of Macedonia, 2013).

MATERIALS AND METHODS

In field conditions, five potato cultivars were investigated: Desire, Kondor, Ultra, Carlita, and Arnova, as well as six different variants of herbicides: absolute control, mechanical control, pendimetalin, linuron, metribuzin PRE, and metribuzin POST.

The experiment was located in the Gorno Sedlarce locality in the 2013 production year.

The experimental scheme was a randomized block with three replications for each variant with the size of experimental plots of 21 m², and the following parameters were investigated:

- The height of the plant
- Number of tubers per plant

RESULTS AND DISCUSSION

Tab.1 – The impact of herbicides on the height of the potato plant

Variety Variant s	Desire		Kondor		Ultra		Carlita		Arnova		Average	
	Cm	%	cm	%	cm	%	Cm	%	cm	%	cm	%
MK	57,6	100,0	60,9	100,0	78,4	100,0	61,9	100,0	60,7	100,0	63,9	100,0
AK	59,4 ^N _s	103,1	62,4 ^{NS}	102,5	79,5 ^N _s	101,4	62,0 ^N _s	100,2	60,5 ^{NS}	99,7	64,8 ^N _s	101,4
H1	57,8 ^N _s	100,3	64,0*	105,1	73,3*	93,5	60,3 ^N _s	97,4	56,4*	92,3	62,4 ^N _s	97,6
H2	58,9 ^N _s	102,2	66,2*	108,7	78,8 ^N _s	100,5	61,9 ^N _s	110,0	61,3 ^{NS}	101,0	65,4 ^N _s	102,3
H3	58,6 ^N _s	101,7	65,0*	106,7	79,4 ^N _s	101,3	62,6 ^N _s	101,1	62,1 ^{NS}	102,3	65,5 ^N _s	102,5
H4	59,4 ^N _s	103,1	62,0 ^{NS}	101,8	78,3 ^N _s	99,8	61,6 ^N _s	99,5	59,6 ^{NS}	98,2	64,2 ^N _s	100,5
H5	58,7 ^N _s	101,9	64,3 ^{NS}	105,6	77,4 ^N _s	98,7	61,6 ^N _s	99,5	59,8 ^{NS}	98,5	64,4 ^N _s	100,8
LSD 0,05	3,02		2,64		4,65		4,19		2,82		1,83	
LSD 0,01	4,29		3,75		6,62		5,94		4,01		2,49	

* Statistical significance at the 0.05 level

** Statistical significance at the 0.01 level

NS- no significance

MK- mechanical control
 AK- absolute control
 H1 - linuron
 H2 - pendimetalin
 H3 - metribuzin PRE
 H4 - metribuzin POST
 H5 – average of all herbicide variants

Based on the obtained results, the following was established: Cultivar Desire reached the highest height in the H4 variant, also 59.4 cm, while the lowest height in the H1 variant was 57.8 cm, Kondor in the H2 variant was also 66.2 cm while lower in the H4 variant 62.0 cm, Ultra in the H3 variant also 79.4 cm while lower in the H1 variant 73.3 cm, Carlita in the H2 variant 54.2 cm while lower in the H3 variant 62.6 cm, Arnova in the H3 variant 62.1 cm while the lowest in the H1 variant 56.4 cm or on average all types of potatoes reached the highest height in the H3 variant 65.5 cm while the smallest in the H1 variant was also 62,4 cm.

Statistical significance at the 0.05 level was observed in the Kondor and Ultra cultivars in the H1 variant, while at the 0.01 level statistical significance was observed in the Arnova cultivar in the H1 variant. Meanwhile, the average of all cultivars in all variants shows that there was no significance at both levels.

Tab.2 – Impact of herbicides on the number of tubers per plant

Variety	Desire		Kondor		Ultra		Carlita		Arnova		Average	
	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%
MK	10,0	100,0	8,7	100,0	8,7	100,0	8,0	100,0	9,0	100,0	8,9	100,0
AK	5,7**	57,0	4,7**	54,0	5,0**	57,5	4,3**	53,7	4,0**	44,4	4,7**	52,8
H1	10,0 ^{NS}	100,0	9,0 ^{NS}	103,7	8,0 ^{NS}	91,9	9,7 ^{NS}	121,2	9,7 ^{NS}	107,8	9,3 ^{NS}	104,5
H2	9,0 ^{NS}	90,0	9,3 ^{NS}	106,9	8,7 ^{NS}	100,0	10,0 ^{NS}	125,0	10,7 ^{NS}	118,9	9,5 ^{NS}	106,7
H3	10,3 ^{NS}	103,0	8,7 ^{NS}	100,0	7,0 ^{NS}	80,4	9,0 ^{NS}	112,5	10,3 ^{NS}	114,4	9,1 ^{NS}	102,2
H4	10,0 ^{NS}	100,0	10,0 ^{NS}	114,9	8,0 ^{NS}	91,9	10,0 ^{NS}	125,0	9,0 ^{NS}	100,0	9,4 ^{NS}	105,6
H5	9,8 ^{NS}	98,0	9,2 ^{NS}	105,7	7,9 ^{NS}	90,8	9,7 ^{NS}	121,2	9,9 ^{NS}	110,0	9,3 ^{NS}	104,5
LSD 0,05	1,95		2,14		1,98		2,44		2,29		0,99	
LSD 0,01	2,82		3,05		2,82		3,47		3,26		1,35	

* Statistical significance at the 0.05 level

** Statistical significance at the 0.01 level

NS- no significance

MK – mechanical control

AK - absolute control

H1 - linuron

H2 - pendimetalin

H3 - metribuzin PRE

H4 - metribuzin POST

H5 – average of all herbicide variants

Based on the obtained results, the following has been established: Cultivar Desire has the highest number of tubers in the H3 variant (10.3), while the smallest number in the H2 variant (9.0), Kondor has the highest number of tubers reached the H4 variant (10.0), while a smaller number reached the H3 variant (8.7), Ultra the highest number of tubers reached the H2 variant (8.7), while the smallest number reached the H3 variant H3 (7.0), Carlita, the highest number of tubers has reached the H2 and H4 variants (10.0), while the smallest number has reached the H3 variant

(9.0), Arnova, the highest number of tubers has reached in the H2 variant (10.7), while a smaller number in the H4 variant (9.0) or, on average, all types of potatoes have a greater number of tubers in the H2 variant (9.5), while a smaller number in variant H3 (9,1).

Despite the small differences in the number of tubers per plant, no statistical significance was observed either at the 0.05 level or at the 0.01 level.

CONCLUSIONS

Based on the results obtained for the height of the potato plant, it can be observed that in the Desire variety, we have no significance at any level, and in any variant, in the Kondor variety we have significance at the 0.05 level in the H1 variants, while at the 0.01 level in the H2 and H3 variants, in the Ultra variety we have significance in the H1 variant at the 0.05 level, in the Carlita variety we have significance in the H1 variant at both levels and in the Arnova variety we have no significance at both levels.

Based on the results obtained for the number of tubers per plant, we can conclude that in no variant and any cultivar we have no significance at both levels.

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