

## **CORRELATION BETWEEN PLANT VARIETY AND NUMBER OF TUBERS PER PLANT SOME POTATO CULTIVARS**

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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 studied: 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 m<sup>2</sup>. The experiment was carried out in the locality of Gorno Sedlarce, Tetovo. Based on the obtained results, the following conclusions were established: The cultivar Desire reached the highest height in the H1 variant and 54.2 cm, while the lowest height in the H4 variant was 43.4 cm, the Kondor cultivar in the H1 variant and 48.3 cm, while the lowest in the H4 variant also 42.1 cm, the Ultra cultivar in the H2 variant also 69.2 cm while lower in the H3 variant also 66.8 cm, the Carlita cultivar in the H2 variant 49.7 cm while lower in the H4 variant also 42.7 cm, the cultivar Arnova in the H1 variant 60.1 cm while the lowest in the H4 variant 46.8 cm or on average all types of potatoes reached the highest height in the H1 variant 55.7 cm while the smallest in the H4 variant and the 46.8 cm one. According to the results obtained for potato height, it can be noticed that only in the Arnova cultivar the H1, H2 and H5 variants are significant at the 0.05 level and in the H4 variant at the 0.01 level. Meanwhile, regarding the average of all cultivars, we have no significance at both levels in all variants.

*Keywords:* variant, efficiency, phytotoxicity, cultivar.

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### **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. The center of origin of the potato is considered the mountain massifs of the Andes in South America, specifically the states of Peru and Chile (Kostov, 2003).

At the global level, potatoes exceed the production of 374,000,000 tons. (FAOSTAT, 2013).

Potato tubers are also rich in amino acids such as (tryptophan, lysine, valine, methionine, etc.), very important for the human body. Potato skin 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 good crop from an agrotechnical point of view because it represents a very important pre-crop for many other agricultural crops.

As a foraging crop that feeds abundantly, it leaves the soil loose and rich in mineral matter (Egumenovski *et al.* 1998). In 2010, worldwide, potatoes were cultivated in an area of 19,083,575 ha with a production of 324,420,782 tons, with an average yield of 17.0 t/ha (Eurostat, 2012). In Macedonia, potatoes are cultivated in 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 2014 production year. The experimental scheme was a randomized block with three replications for each variant with the size of experimental plots of 21 m<sup>2</sup>, and the following parameters were investigated:

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

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

Variety Variants	Desire		Kondor		Ultra		Carlita		Arnova		Average	
	cm	%	cm	%	Cm	%	Cm	%	cm	%	Cm	%
MK	45,6	100,0	42,4	100,0	67,6	100,0	42,3	100,0	55,2	100,0	50,6	100,0
AK	53,5**	117,3	46,0 <sup>NS</sup>	108,5	69,7 <sup>NS</sup>	103,1	46,1 <sup>NS</sup>	109,0	52,1 <sup>NS</sup>	94,4	53,5 <sup>NS</sup>	105,7
H1	54,2**	118,9	48,3*	113,9	68,3 <sup>NS</sup>	101,1	47,5*	112,3	60,1 <sup>NS</sup>	108,9	55,7**	110,1
H2	49,9 <sup>NS</sup>	109,4	44,5 <sup>NS</sup>	105,0	69,2 <sup>NS</sup>	102,4	49,7**	117,5	58,7 <sup>NS</sup>	106,3	54,4*	107,5
H3	45,0 <sup>NS</sup>	98,7	42,5 <sup>NS</sup>	100,2	66,8 <sup>NS</sup>	98,8	45,1 <sup>NS</sup>	106,6	51,8 <sup>NS</sup>	93,8	50,2 <sup>NS</sup>	99,2
H4	43,4 <sup>NS</sup>	95,2	42,1 <sup>NS</sup>	99,0	67,1 <sup>NS</sup>	99,3	42,7 <sup>NS</sup>	100,9	46,8**	84,8	48,4 <sup>NS</sup>	95,6
H5	48,1 <sup>NS</sup>	105,5	44,3 <sup>NS</sup>	104,5	67,8 <sup>NS</sup>	100,3	46,2 <sup>NS</sup>	109,2	54,3 <sup>NS</sup>	98,4	52,2 <sup>NS</sup>	103,2
LSD 0.05	4,64		4,26		6,52		4,82		5,06		3,05	
LSD 0.01	6,60		6,05		9,28		6,85		7,20		4,16	

\* 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

## RESULTS AND DISCUSSION

Based on the obtained results, it was found that the cultivar Desire reached the highest height in the H1 variant, 54.2 cm, while the lowest height in the H4 variant was 43.4 cm. There was statistical significance in the H1 variant at the 0.01 level. The Kondor cultivar had the highest height in the H1 variant, 48.3 cm, while the lowest in the H4 variant was 42.1 cm.

There was statistical significance in the H1 variant at the 0.05 level. The Ultra cultivar in the H2 variant is also 69.2 cm, while the lowest in the H3 variant is also 66.3 cm.

There was no statistical significance at any level. Cultivar Carlita in the H2 variant was 49.7 cm while lower in the H4 variant was 42.7 cm, Statistical significance was in the H1 variant at the 0.05 level and in the H2 variant at the 0.01 level. Cultivar Arnova in the H1 variant was 60.1 cm while lower in the H4 variant at 46.8 cm Statistical significance was in the H4 variant at the 0.01 level. On average, all potato cultivars reached the highest height in the H1 variant, 55.7 cm, while the smallest in the H3 variant was 50.2 cm. There was statistical significance in the H1 variant at the 0.01 level and in the H2 variant at the 0.05 level.

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

Kultivars Variants	Desire		Kondor		Ultra		Carlita		Arnova		Average	
	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%	Nr.	%
MK	9,5	100,0	9,2	100,0	7,6	100,0	8,6	100,0	8,4	100,0	8,7	100,0
AK	4,4**	46,1	4,2**	45,6	3,6**	47,4	3,8**	44,2	4,2**	50,0	4,0**	46,0
H1	9,7 <sup>NS</sup>	102,0	9,0 <sup>NS</sup>	97,8	8,0 <sup>NS</sup>	105,3	8,6 <sup>NS</sup>	100,0	10,7*	127,4	9,2 <sup>NS</sup>	105,7
H2	9,0 <sup>NS</sup>	95,2	8,6 <sup>NS</sup>	93,5	7,4 <sup>NS</sup>	97,4	8,6 <sup>NS</sup>	100,0	10,2*	121,4	8,8 <sup>NS</sup>	101,1
H3	9,5 <sup>NS</sup>	10,10	9,2 <sup>NS</sup>	100,0	8,2 <sup>NS</sup>	107,9	8,0 <sup>NS</sup>	93,0	9,4 <sup>NS</sup>	111,9	8,9 <sup>NS</sup>	102,3
H4	9,0 <sup>NS</sup>	95,2	9,4 <sup>NS</sup>	102,2	6,8 <sup>NS</sup>	89,5	8,2 <sup>NS</sup>	95,3	11,0**	130,9	8,9 <sup>NS</sup>	102,3
H5	9,3 <sup>NS</sup>	98,5	9,1 <sup>NS</sup>	98,9	7,6 <sup>NS</sup>	100,0	8,3 <sup>NS</sup>	96,5	10,3*	122,6	8,9 <sup>NS</sup>	102,3
LSD 0,05	1,40		1,66		1,94		1,29		1,73		0,79	
LSD 0,01	1,99		2,36		2,78		1,83		2,45		1,08	

\* 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 – an average of all herbicide variants

As for the number of tubers, based on the obtained results, it was found that the number of tubers in the cultivar Desire varies from 9.0 in the H2 variant to 9.7 in the H1 variant, in the Kondor cultivar it varies from 8.6 to the H2 variant up to 9.4 in the H4 variant, in the Ultra cultivar it is brought from 7.4 in the H2 variant to 8.2 in the H3 variant, in the Carlita cultivar it is brought from 8.0 in the H3 variant to 8.6 in the H1 and H2 variants, in the Arnova cultivar is brought from 9.4 in the H3 variant to 11.0 in the H4 variant or on average in all potato cultivars the number of tubers is brought from 8.8 in the H2 variant to 9.2 in the H1 variant.

Based on the results obtained for the potato height, it can be observed that only in the Arnova cultivar the H1, H2, and H5 variants are significant at the 0.05 level and in the H4 variant at the 0.01 level. Meanwhile, regarding the average of all cultivars, we have no significance at both levels in all variants.

## CONCLUSION

Based on the results obtained for the height of the potato plant, it can be observed that in the Desire variety, we have significance only between the KM variant and the H1 variant at both levels, in the Kondor variety we have significance in the H1 variants at the 0.05 level, in the Ultra and Karlita varieties we have no significance and in the Arnova variety we have significance in the H1, H2, and H5 variants at the 0.05 level and in the H4 variant at the 0.01 level. Taken in general, the average plant height of all varieties is not significant for this parameter. So, the height of potato plants is characteristic of the cultivar and does not depend on the influence of herbicides under normal conditions. Based on the results obtained for the number of tubers per plant, we can conclude the following: In the Desire, Kondor, Ultra, and Carlita varieties, we have no significance at both levels, while in the Arnova varieties, we have significance at the 0.05 level and that in the H1 variants, H2, and H5 and at the 0.01 level in the variant H4. In the parameter number of tubers per plant, we have no significance in the average of all varieties, this fact shows that the number of tubers is a property of the cultivar but that it can be influenced by external climatic factors, not even by the use of different herbicides.

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