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**POTATOES PRODUCTIVITY OF VARIETIES WHILE USING FOR
DIFFERENT WAYS OF ADSORBENT**

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This article shows the research results from the study of influence of different methods of biohumus applying on the productivity of early harvest potato. The features of phenological phases of passing growth and development plants are set. It also determines the difference in the productivity in Right-bank Forrest-steppe area of Ukraine.

Growing of early harvest potatoes is 35–45 % out of general production as on the beginning of spring and summer. During this time certain products are brought by world export leaders such as Egypt, Turkey, Spain and other countries. Europe is provided with this products all year round. Ukraine is one of the ten greatest producers of potatoes, but never occupied leading positions in world export of potatoes [1, 6].

Potato production is a valuable industrial and feeding crop, which accumulates plenty of useful nutritives and unlike other vegetables is accessible for growing in all soil-climatic areas of Ukraine. Potatoes are grown all over the world, where sowing areas reached the level of 20 million hectares, and gross collection of tubers is 310 million with insignificant rejections. P.S. Teslyuk points out that in Ukraine about 1,6 million hectares of potatoes is grown annually in agricultural and farmer enterprises, as well as vegetable gardens and summer residence areas of the country. O. Yagolnik stresses that for most countries with the high development level the international potatoes trading is very effective [6, 7].

The growing conditions of plants with independent from man reasons are not the way they should be for living plant organisms and that's why scientists and practice specialists offered many ways which would help to create conditions which are maximally close to optimum such as: choice of a kind, plant to soil way of growing, regulators of plants growth, quick-dissolving organic mineral fertilizers are

balanced, artificial acceleration and others [1, 3, 4, 5].

The receiving of early products stimulates not only the acceleration of consumption but also lengthening of term of consumption in general to the increase of incomes from high prices on early harvest vegetables. Therefore, analyzing these literature facts we came to the conclusion that the most effective measures which are helping to receive early harvest and extend the period of consumption is a choice of a kind (sort), usage of regulators of growth of plants, which does not have enough studies on the potatoes growth. Lately the humanity aims to consume environmentally clean or organic production. That's why in the researches we aimed to learn the conditions of receiving of high productivity of early harvesting potatoes for applications of biological preparations, which include biohumus.

Materials and methods of researches. Experiments were made in the vegetable crop rotation of NNVU Uman NUH on heavy loameblack soil in 2010–2012. In researches there were used those kinds of potatoes that were included to the State Register of kinds of plants: Serpanok, Red Scarlet, Latona.

During the experiment there were made some phenological and biometrical searches such as fixing the date of exploding of tubers, apperance of the first and mass growth steps, beginning of growth of escapes, formation of bush, harvesting; determined mass of tubers a gravimetric method, conducted the account of harvest and estimated quality of products by DSTU ISO2165-2002.

Researches were conducted with the usage of compost for artificial populations of combination of cow pus after the process of fermmentation, soil, debris of grass, vegetable and fruit origin. In order to get the high quality feed for Californian worms adhered to such indexes of actual organic substrate: humidity 70–80 %, pH 6,8–7,2, content of iron oxide not more than 10 %, absence of hard parts – metal, tree, stone, glass and others. For fermentation procedures the organic wastes and floor pus were composted. The complete period of fermentation of substrate lasted for 5 months. The basis of compost was dung biomass which included the certain amount of other organic wastes (straw, fruit and vegetables leftovers, vegetable unstrach, leaves), which did not containe pesticides, ammonia, methane, pathogenic microflora, eggs and larvae of helminths, protein content was not more than 25 %.

To determine the efficiency of biohumus application during growing of potatoes it was applied locally before an exploding, mulched soil and sprinkled with the solution of plant biohumus at the beginning of intensive growth.

Researches results. It was clarified that in the conditions of substrate humidity of 65 % and temperature of 15–25 degrees by Celcium, and also worm feedings, as necessary for period of cultivation of populations its closeness grew in 2,3–9,4 times (table 1).

The biggest increase of populations was noticed during 2010, that is related to the climatic conditions which predetermine speed and intensity of motion of physiology processes in worm organism.

1. Dynamics of density of artificial population *Eisenia foetida* Savigny

Number	Volume	Quantity of populations in single units			Density of populations unit/m ³		
		2010	2011	2012	2010	2011	2012
1	0,250	667,7	658,1	713,3	2714,0	2675,2	3875,2
2	0,700	289,8	1957,7	1544,0	851,0	2824,9	935,2
3	0,400	543,0	588,3	667,0	1500,0	1625,1	1700,0
<i>HIP₀₅</i>		27,3	61,7	81,4	89,0	122,3	441,5

With the purpose of determination of influence of growing terms on growth and development of potato kinds there were conducted the biometrical measurings.

It was set that in the phase of mass growing stages the higher kind of potatoes was the Latona sort for using local preseed biohumus which height was 7,0 cm. The kind that was used as a control had a difference in height which was 3,0 cm. During the intensive growth period the plants height was at the level of 20–28 cm. During the blossom period the sorts of Latona and Red Scarlet were higher while using the local preseed biohumus, where this index was 52,0 and 49,0 cm accordingly (table 2).

2. Potato plants height using different kinds of biohumus applying, cm

Kind	Method of applying	Mass growing stages	Intensive growth	Blossoming
Serpanok	without applying of biohumus (C)*	3	20	36

Latona	local preseed applying	5	24	41
	mulchin of soil	4	22	38
	local preseed applying	7	28	52
Red Scarlet	mulching of soil	6	25	47
	local preseed applying	6	26	49
	mulching of soil	5	23	42

*C – control

The reseaches results testify that the phitometrical indexes of plants changed depending on a sort and methods of applying of biohumus, such as an area of one leaf, general area of leaves on the field surface (table 3).

3. Biometrical index of early harvestin potatoes at the stage of blossoming while using different kinds of biohumus applying

Kind	Kind of applying	Number of leaves for a plant			Area of leaves, thousands m ² /ha		
		2011	2012	average	2011	2012	average
Serpanok	without biohumus (C)*	52	46	49	16,7	14,8	15,5
	local preseed applying	52	46	49	16,8	14,3	15,6
	soil mulching	53	46	49	16,7	14,8	15,3
Latona	local preseed applying	60	53	57	24,8	21,9	23,3
	soil mulching	59	51	55	23,0	19,8	21,4
Red Scarlet	local preseed applying	56	48	52	18,9	16,2	17,5
	soil mulching	57	50	54	18,8	16,4	17,6
HIP ₀₅		3,1	2,7		4,1	3,9	

*C– control

The biometrical measuring showed that the highest speed of growth had the early harvesting kinds of Latona potatoes, Red Scarlet at the local preseed applying of biohumus the height of plants of which reached 70–75 cm. The shortest were plants of Serpanok kind. They reached the height of 57 cm.

An importang role for potatoes plays such an index as the amount of leaves. Without biohumus applying the amount of leaves reached 49pcs. With the usage of biohumus locally into soil or with mulching of preplant teritory the amount of leaves increased to 55–57 pcs. in Latona kind and 52–54 pcs. in Red Scarlet kind.

By the period of technical ripeness of tubers leaves were groving more intensively at the Latona kind at the local preseed applying of biohumus the leaf area

in 2011 and 2012 was 24,8 and 21,9 thousands of m²/ha and was accordingly higher in 8,1 and 5,2 thousands of m²/ha over the control. The less area of leaves was noticed at the Latona plants at mulching of soil.

So, in 2011 the area of plant leaves while using mulching of soil was 23,0 thousands of m²/ha, which is 6,3 thousands of m²/ha less than under the control. In 2012 this difference was accordingly 6 thousands of m²/ha. In control the leaf area in the noted phase was 15,5 thousands m²/ha.

Consequently the usage of biohumus on fertilized black soil is increasing the amount and area of potato leaves. These indexes reached the greatest value at the local preseed applying of biohumus.

Plants on the area consist of potato bushes and stems in each of them. Information about the proper indexes is presented in a table (table4).

4. Footstalk development of potato kinds

Kind	Way of applying	Amount of footstalks in a bush			Number of footstalks for 1 ga of soil		
		2011	2012	average	2011	2012	average
Serpanok	without biohumus applying (C)*	4,0	3,8	3,9	163,3	155,1	159,2
	local preseed applying	6,1	6,0	6,1	208,2	204,1	206,2
	mulching of soil	4,8	4,7	4,8	196,0	191,8	193,9
Latona	local preseed applying	6,2	6,4	6,3	171,4	163,3	167,4
	mulching of soil	5,0	5,8	5,4	163,3	155,1	159,2
Red Scarlet	local preseed applying	6,1	6,3	6,2	208,2	204,1	206,2
	mulching of soil	5,8	5,9	5,9	196,0	191,8	193,9
HIP ₀₅		3,1	2,7		4,1	3,9	

The greatest number of escapes the plants of a Serpanok kind, Red Scarlet and Latona at the local preseed biohumus applying – from 6,1 to 6,3 pcs/plant. The lowest index was at Serpanok kind where there were no biohumus applied at all – 3,9 pcs/plant.

The amount of tubers for a potato is of a great importance. This index showed the difference between the sorts of Serpanok and Red Scarlet. Their plants had 6–15 tubers an average (table 5).

5. Productivity of early harvesting potatoes depending on the method of biohumus applying, t/ga

№	Way of applying	Number of trading units	Productivity, t/ga
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		2011	2012	average	2011	2012	average	± before control
Serpanok	without biohumus applying (C)*	6	8	7	24,5	25,1	24,8	0
	local preseed applying	9	10	10	36,4	41,1	38,8	14,0
	mulching of soil	7	7	7	33,9	41,8	37,9	13,0
Latona	local preseed applying	10	14	12	36,2	35,3	35,8	11,0
	mulching of soil	6	8	7	34,5	35,7	35,1	10,3
Red Scarlet	local preseed applying	9	12	11	36,4	34,1	35,3	10,5
	mulching of soil	7	9	8	33,9	35,8	34,9	10,1
<i>HIP₀₅</i>		2,3	2,2		4,9	5,4	—	

*C – control

The analysis of table data allowed to set that the local biohumus applying had the greatest influence and more productivity as of the method of growing, expressed potato kinds of Serpanok, Latona and Red Scarlet, which in comparison before the control allowed to get 10,5–14,0 t/ha of an additional products.

Conclusions. On fertilized black soil of Right-bank Forest-steppe of Ukraine the local applying of biohumus had the greatest influence in comparison before control allowed to get 10,5–14,0 t/ha of additional products at the kinds of Serpanok, Latona and Red Scarlet.

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