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PRODUCTIVITY OF POTATO DEPENDING ON THE DARK GRAY PODZOLIZED SOILS OF MALE POLISSIA

A potato plant, like every other organism, is a complex biological system that self-regulates, self-evolves and self-replicates. Despite the fact that about 95% of the dry matter of plants is created in the process of photosynthesis and only 5% of it belongs to ash elements (ash), the role of the latter in the life of the organism is very significant [1, 2].

For potatoes there are five levels of mineral content: acute starvation with visual signs; latent starvation without external signs, but with a decrease in yield; optimal nutrition; excessive nutrition, which does not reduce the yield, but often - to reduce the quality of tubers; excessive nutrition with signs of toxicity, which leads to a decrease not only in the quality, but also in the amount of crop [3, 4, 6].

The field studies were conducted during 2017-2018 in conditions of Zhovkivsky district of Lviv region on dark gray podzolized soils with potatoes of the variety Promin' to study the introduction of different norms of mineral fertilizers against the background of organic ones 30 t / ha.

The dark gray podzolized soils were studied and characterized by an average content of humus (2,5-2,6%), a slightly acidic reaction of soil solution (salt pH 6,5), a content of lightly hydrolyzed nitrogen (80 mg), mobile phosphorus (72 mg) and exchangeable potassium (112 mg) per 1 kg of soil.

The experimental scheme included the following options: control – without fertilizers; 30 t / ha manure – background; background + $N_{45}P_{30}K_{60}$; background + $N_{60}P_{45}K_{75}$; background + $N_{75}P_{60}K_{90}$; background + $N_{90}P_{75}K_{105}$; background + calculated norm $N_{105}P_{90}K_{120}$ for the programmed yield of 300 centners / ha.

Against the background of 30 t / ha of mixed manure, with the introduction in the autumn, the various forms of mineral fertilizers were brought in. The nitrogen fertilizers in the form of ammonium nitrate (34%) (the State Standart 2-85) were introduced in the spring in pre-sowing cultivation, the phosphorus fertilizers in the form of granular superphosphate (19%) (the State Standart 5956-78) and potassium fertilizers in the form of potassium magnesia of Patentkali® of the German company K + S KALI GmbH (K_2O - 30%, MgO - 10%) were introduced in the autumn under the plowing.

The experiments were carried out in a fourfold repetition. The total area of each section is 150 m², the accounting area is 100 m².

The Promin' variety (the applicant – the Institute of growing potato UAAS) is medium-term, of the dining area of use, since 2006 recommended for cultivation in all soil-climatic zones of Ukraine.

The farming equipment on the test field was generally accepted for this zone. The predecessor is winter wheat.

Before laying the field experiment and before harvesting in the depth of the arable layer, the soil samples were taken in accordance with the State Standart ISO 11464-2001, in which, according to standard methods, lightly hydrolysed nitrogen was defined using the Tyurin and Kononovaya method, mobile phosphorus and exchangeable potassium in the aqueous extraction

using the Kirsanov method in the modification of NSC ISSA (the State Standart 4405: 2005).

The harvest accounting was conducted with a more accurate solid method. The harvest data was processed by the dispersion method [5].

The content of starch in potatoes was defined by its specific weight on the scales of Reyman and Parov.

According to the results of the research (Table 1), the potato yield increased when the amount of mineral fertilizers was increased in the background of 30 t / ha of organic fertilizers. The largest increase in yield capacity of 146 centners / ha to the control variant was obtained in the version with making the calculated norm $N_{105}P_{90}K_{120}$ against the background of 30 t / hectare of manure for the programmed yield of 300 centners / ha.

Table 1. The impact of fertilizers on the yield and quality of potatoes

The research variants	Tubers productivity, centners / ha	Increase in productivity			
		to the control		to the background variant	
		cent-ners / ha	%	centners / ha	%
The control – without fertilizers	152	-	-	-	-
30 t / ha manure – the background	198	46	30,3	-	-
background + $N_{45}P_{30}K_{60}$	242	90	59,2	44	22,2
background + $N_{60}P_{45}K_{75}$	254	102	67,1	56	28,3
background + $N_{75}P_{60}K_{90}$	266	114	75,0	68	34,3
background + $N_{90}P_{75}K_{105}$	280	128	84,2	82	41,4
background + the calculated norm $N_{105}P_{90}K_{120}$ for the programmed yield of 300 centners / ha	298	146	96,1	100	50,5
HIP ₀₅ , centners	9,7				

By introducing only the organic fertilizer in the norm of 30 t / ha it was obtained 198 centners / ha, 46,0 centners / ha or 30,3% that is higher than the control variant. In the third, fourth, fifth and sixth variants of the experiment, yields increased respectively 90, 102, 114 and 128 centners / ha.

The statistical processing of harvest data confirms their certainty.

The content of starch in potato tubers was the lowest in the variant of the experiment with introducing on the background of 30 t / hectare of mixed manure of the calculated norm $N_{105}P_{90}K_{120}$ on the programmed yield of 300 centners / ha and was 15,4%, but its yield in this variant because of the high yields is the highest – 45,9 centners / ha. In the other variants of the experiment, the indicated rates were a bit lower. By introducing the organic fertilizers only in the norm of 30 t / ha of manure the starch was 32,1 centners / ha, which is 7,2 c higher in comparison with control. In the third, fourth, fifth and sixth variants of the experiment, the starch yield increased, respectively, 13,6, 15,2, 16,9 and 18,8 centners / ha (Table 2).

Table 2. The impact of fertilizers on the content and yield of starch

The research variants	The starch content, %	Yield, centners / ha	The yield of starch, centners / ha	The starch yield increase	
				centners / ha	%
The control – without fertilizers	16,4	152	24,9	-	-
30 t / ha manure – the background	16,2	198	32,1	7,2	28,8
background + $N_{45}P_{30}K_{60}$	15,9	242	38,5	13,6	54,5
background + $N_{60}P_{45}K_{75}$	15,8	254	40,1	15,2	61,2
background + $N_{75}P_{60}K_{90}$	15,7	266	41,8	16,9	67,7
background + $N_{90}P_{75}K_{105}$	15,6	280	43,7	18,8	75,4
background + the calculated norm $N_{105}P_{90}K_{120}$ for the programmed yield of 300 centners / ha	15,4	298	45,9	21,0	84,3

Consequently, for the cultivation of the potato variety Promin' on the dark gray podzolized soils of the Male Polissia after the winter wheat, we propose to bring in the programmed yield

of 300 centners / ha the mineral fertilizers in the norm $N_{105}P_{90}K_{120}$ against the background of 30 t / ha of manure. The nitrogen fertilizers are proposed to be introduced in spring in the pre-sowing cultivation, but the organic, phosphate and potassium fertilizers in autumn under the plowing. With such norms of introducing of organic and mineral fertilizers the yield of 298 centners / ha with the largest yield of starch 45,9 c / ha can be obtained.

References

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ЗМІНА ЧИСЕЛЬНОСТІ ЛЮМБРИЦИДІВ В ОРНОМУ ШАРІ ҐРУНТУ І ПРОДУКТИВНОСТІ СІВОЗМІНИ ЗА РІЗНИХ СИСТЕМ ОСНОВНОГО ОБРОБІТКУ

Дослідження виконувалися впродовж 2016 – 2018 рр. у польовому стаціонарному досліді на дослідному полі Білоцерківського НАУ. Ґрунт – чорнозем типовий глибокий мало гумусний.

У сівозміні досліджували чотири варіанти основного обробітку (Табл.1) і чотири системи удобрення. Рівні щорічного внесення добрив на 1 га ріллі становили: нульовий рівень – без добрив; перший – 8 т/га гною + $N_{76}P_{64}K_{57}$; другий – 12 т/га гною + $N_{95}P_{82}K_{72}$; третій – 16 т/га гною + $N_{112}P_{100}K_{86}$.

На дату сівби сільськогосподарських культур у шарі ґрунту 0-10 см чисельність люмбрицидів найнижча за полицевого, а найвища за безполицевого і диференційованого обробітку. Дещо нижчий цей показник за постійного мілкого обробітку в сівозміні. За безполицевого, полицевого-безполицевого і дискового обробітку в сівозміні кількість дощових черв'яків в середньому по варіантам досліді відповідно на 25,4; 26,6 і 18,5 %