

Influence of long application of fertilizers on productivity of photosynthesis and productivity of spring wheat

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The purpose. To determine influence of regular application of artificial fertilizers on the background of after-effect of muck in dose of 30 t/hectare on productivity of grain of regionized variety of spring wheat Mironovskaya Yaraya, and also on some physiologic processes in plants at growing on averagechernozem carbonate soil. **Methods.** They carried out field probes in grain-beet crop rotation, phenological observations and biometrical measurements of the square of a leaf area. **Results.** By probes on average-chernozem carbonate soil it is determined that long application of artificial fertilizers on the background of after-effect of organic ones ensures increase of grain yield of zoned cultivar of spring wheat Mironovskaya Yaraya for 1,62 t/hectare. The greatest index of pure productivity of photosynthesis makes 11,5 g/m² for a day in alternative where they studied action of sesquilateral dose of artificial fertilizers on the background of after-effect of muck in dose of 30 t/hectare, and during most healthy growth of plants of spring wheat (compared with the supervisory control) — 7,45 g/m². **Conclusions.** Importation of artificial fertilizers in different doses and ratios on the background of after-effect of muck in dose of 30 t/hectare increases productivity of grain of spring wheat cultivars Mironovskaya Yaraya for 0,51 – 1,62 t/hectare, at productivity in the supervisory control of 2,18 t/hectare. In all growth phases and development of plants of spring wheat the amount of dry matter in alternatives with use of fertilizer, exceeded its indexes in alternative without fertilizers (supervisory control). Optimum indexes of square of a leaf area of spring wheat of pure productivity of photosynthesis are determined in alternative where they studied action of sesquilateral dose of artificial fertilizers on the background of after-effect of muck in dose of 30 t/hectare.

Key words: *spring wheat, increase of crop, square of leaves, dry matter, productivity of photosynthesis.*

Forming of sowing with the optimal area of puff surface is a major condition of receipt of high harvests, that can be the diagnostic index of the productivity [1-5]. The productivity of sowing, level of biological and economic harvest of agricultural cultures, must be determined by an index, but dynamic correlation of allelement of photosynthesis [6-8].

Most and the best inequality harvest can be obtained only in sowing that own the optimal after size areas of sheets and process of the forming [2, 5].

Connection between photosynthesis and harvest is very difficult, and changeable. The common amount of the accumulated organic substance depends on a balance between the processes of the synthesis and decomposition [9-10]. Content of dry substance has direct effect toward the feed value of culture. In this connection an important moment is a study of dynamic of accumulation of dry substance by the plants of wheat [4, 8].

Aim. To define influence of systematic application of mineral fertilizer on a background of after-effect of a 30 t/hectare manure on the harvest of grain of sort of spring wheat and also on some physiology processes in plants at growing on black carbonate soil. **Methods.** Researches were conducted by the field and laboratory methods.

Methodology of researches.

The field experience was stopped up on an experience field of department of agricultural chemistry and quality of products of plant-grower the name of O.I. Dychevina at the agronomical experimental station.

Soil of an experience area: black carbonate on a loesslike loam.

Experience is stopped up in a triple reiteration, size of - 172 m², - 100 m². In experience used ammoniac saltpetre (34 %) granular superphosphate (19,5 %) and potassium chlorous (60 %). Fertilizers brought in according to the chart of experience. The field researches were conducted in a crop rotation on a chart:

1. Control (without fertilizers)
2. Afteraction of 30 t/he - FON
3. Background+of P₈₀
4. Background+of P₈₀K₈₀
5. Background+of N₈₀P₈₀K₈₀
6. Background+of N₁₁₀P₁₂₀K₁₂₀
7. N₈₀P₈₀K₈₀

Soil of an experience area is a black carbonate, on a loesslike loam. The provision of plants nitrogen and phosphorus is middle, by potassium subzero.

An arable layer is characterized middle content of humus (on control of 4,7%), the reaction of the ground solution folds - 8,1-8,3. The provision of plants nitrogen and phosphorus is middle and by potassium subzero. The field researches were conducted in a crop rotation on a chart: control (without fertilizers), afteraction of 30t/he, background+of P80, background+of P80K80, background+of N80P80K80, background+of N110P120K120. N80P80K80.

Size of sowing area - 171,5 m², registration -100 m². The repeated of experience is triple. The selection of vegetable tests with the aim of determination of content of elements of feed came true for to the basic phases of vegetation of plants.

During the vegetation period of plants of furious wheat phenological supervisions were conducted, the biometrical measuring of area of puff surface came true.

A selection is in preparation of standards of plants of wheat to the analysis came true accordingly after pointing driven to : practical "Work on agronomical chemistry" [11], practical work the "Agrochemical analysis" [12], "Laboratory practical work from agricultural chemistry"[13].

Results of researches.

The analysis of the obtained data testifies that growth of area of sheets of furious wheat during a vegetation period takes place unevenly (table. 1).

1. Influence of the protracted application of fertilizers is on the indexes of activity of furious wheat, 2009-2011

Variant of experience	Area of sheets, thousands of m ² /ha				Clean productivity of photosynthesis, g/m ² for twenty-four hours			
	2009	2010	2011	AV for 3	2009	2010	2011	AV for 3
Control (without fertilizers)	31,3	30,9	31,7	31,3	7,09	7,45	7,82	7,45
Afteraction of 30 t/he - FON	31,2	31,8	32,6	31,8	7,14	7,5	7,87	7,50
Background+of P ₈₀	33,7	34,3	35,1	34,3	7,25	7,63	8,01	7,63
Background+of P ₈₀ K ₈₀	39,7	40,5	41,5	40,5	7,7	8,1	8,5	8,1
Background+of N ₈₀ P ₈₀ K ₈₀	44,9	45,6	46,7	45,7	8,74	9,2	9,66	9,2
Background+of N ₁₁₀ P ₁₂₀ K ₁₂₀	50,9	51,6	52,9	51,8	10,9	11,6	12,2	11,5
N ₈₀ P ₈₀ K ₈₀	43,2	43,7	44,8	43,9	8,28	8,7	9,13	8,7
<i>LSD₀₅</i>	5,22	5,70	6,64	5,85	0,84	1,06	0,89	0,93

Growth of area of sheets at the beginning of vegetation takes place very slowly. In variants that was fertilized this index hesitated within the limits of 31,8-51,8 thousand m²/ha, in control this index presented is 31,3 thousand m²/ha/

The got results of researches testify that application of mineral fertilizers on a background the afteraction of 30 t/heave to rot substantially influenced on growth of area of puff surface of plants of furious wheat. The greatest index of growth of area of sheets of furious wheat is marked in a variant, where brought in the one-and-a-half norm of fertilizers on a background the afteraction of 30 t/heave to rot, what станов51,8 m²/haResearch results testify that the most index of the clean productivity of photosynthesis makes 11,5 gs/of m² for twenty-four hours in a variant, where we studied the action of one-and-a-half norm of mineral fertilizers on a background the afteraction of 30 т/he leave to rot, in a period the most intensive height of plants of furious wheat, comparatively with control - 7,45. The results of researches testify that fertilizers influence on the increase of dry substance in the plants of furious wheat (table.2).

2. Influence of the protracted application of fertilizers in a crop rotation on the accumulation of dry substance in the plants of furious wheat, AV after 2009-2011 pp.

Variant of experience	Phase of height and development of plants			
	bushingout	Anexitis in a tube	earing	completeripeness
Control (without fertilizers)	21,1	225,5	610,5	756,0
Afteraction of 30 t/he - FON	29,2	434,5	649,0	828,5
Background+of P ₈₀	40,5	464,5	632,0	797,0
Background+of P ₈₀ K ₈₀	42,7	464,0	782,0	840,5
Background+of N ₈₀ P ₈₀ K ₈₀	51,7	580,0	746,0	864,0
Background+of N ₁₁₀ P ₁₂₀ K ₁₂₀	53,6	664,0	777,5	881,5
N ₈₀ P ₈₀ K ₈₀	38,2	507,5	651,0	748,0
LSD ₀₅	5,4	60,8	59,8	36,6

Thus, in the process of height and development of plants of furiouswheat, a dry substanceis grownnotevenly, that it is related to the level of mineral feed. Themost in ten siveincrease of dry substance was observed from the beginning of phase of the spring bush ingout to the phase of exitin a tube, in the period of height of stem, and from the phase of exitin a tube to the phase of flowering. Exactly this is determine the requirements of plants of furiouswheat to the terms of feedin different periods of vegetation.

It is set the results of researches, that systematic application of fertilizers causes the considerable changes of the productivity of furious wheat of sort "Миронівська furious" (table.3.).

3. Influence of the protracted application of fertilizers on the harvest of grain of furious wheat, т/he (2009 - 2011)

Variant of experience	Harvest, т/he				Anincrease is to control, t/he			
	2009	2010	2011	AV for 3	2009	2010	2011	AV for 3
Control (without fertilizers)	2,08	2,40	2,06	2,18	-	-	-	-
Afteraction of 30 t/he - FON	2,44	2,90	2,73	2,69	0,36	0,5	0,67	0,51
Background+of P ₈₀	2,73	3,37	3,12	3,07	0,65	0,97	1,06	0,89
Background+of P ₈₀ K ₈₀	2,62	3,12	2,94	2,89	0,54	0,72	0,88	0,71
Background+of	3,25	3,66	3,52	3,47	1,17	1,26	1,46	1,29

N ₈₀ P ₈₀ K ₈₀								
Background+of N ₁₁₀ P ₁₂₀ K ₁₂₀	3,62	3,97	3,83	3,80	1,54	1,57	1,77	1,62
N ₈₀ P ₈₀ K ₈₀	2,98	3,45	3,26	3,23	0,9	1,05	1,2	1,05
<i>LSD</i> _{0,05} /he	0,15 - 0,24							

The most high harvest is got at bringing of N110P120K120.on a background the afteraction of 30 т/and leave to rot - 3,8 т/he grains of furious wheat. Protracted application of mineral fertilizers on a background the afteraction of 30 т/he assists a pus to the increase of harvest of grain of furious wheat on 0,51-1,62 т/he, at a harvest on control according to 2,18 т/he (table. 3).

Conclusions.

Bringing of different doses and correlations of mineral fertilizers on a background the afteraction of 30 t/hethe promotes the harvest of grain of furious wheat of sort a pus on 0,51-1,62 t/he, at a harvest on control 2,18 t/he.Bringing of mineral fertilizers on a background the afteraction of 30 t/heinfluenced a pus on the increase of dry substance in the plants of furious wheat. In all phases of height and development of plants of furious wheat an amount of dry substance is in variants that was fertilized exceeded her indexes in a variant without fertilizers (control).).

At growing of furious wheat of sort the optimal indexes of area of puff surface, clean productivity of photosynthesis are marked in a variant, where the action of one-and-a-half norm of mineral fertilizers was studied on a background the afteraction of 30 t/heleave to rot.

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