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THE GROWTH AND DEVELOPMENT OF DIFFERENT VARIETIES OF WINTER WHEAT IN CASE THEY ARE GROWN AFTER GREEN MANURED FALLOW IN THE SOUTHERN PART OF THE RIGHT-BANK FOREST-STEPPE

The results of the three-year research study of the growth and development of different varieties of winter wheat when they are grown after green manured fallow in the southern part of right-back forest-steppe.

Keywords: *winter wheat, variety, method of planting, seeding rate, yield, grain quality*

Introduction. The main task of modern intensive crop farming was always and is still now the increase of grain production. In the history of its development in Ukraine most of the land of Ukraine was plowed. This led to soil erosion, adversely affected their healthiness, increased the number of pests and diseases, led to widespread use of pesticides, which in turn adversely affected the ecology of agricultural landscapes condition and quality of crop production. So, now the world's crop farming acquires an alternative character. More and more biological and agrotechnical farming practices of crops growing are used [5].

Crop production, in which biological and agronomic tools and techniques of growing crops dominate, recently became known as alternative or biological, ecological, organic and biological. Although each of them defines the specific direction of the crop. The most promising is organic-biological direction. It means a combination, if necessary, organic, biological and agronomic tools to prevent compaction, soil erosion, settlement of various harmful microorganisms [4].

Different directions of crops growing aiming to grow ecologically pure production depend upon the use of both organic and mineral fertilizers. Only the preference is given to biological sources of plant nutrition, such as manure, green manure fertilizers, plant residues perennial and annual grasses, silt.

This plant not only produces high quality, more environmentally friendly products, it helps protect the environment. The important influence of crops to improve soil fertility should be noted, that is defined not only by the quantity but also by the quality of plant residues, in particular their content of nitrogen. The dry weight of root and stubble legumes contain this element 2-2,8% or more, and the remains of cereals – 0,7-1,5% [4, 6].

Therefore, it is possible to increase the potential fertility of soil organic-based on biological system power plants in crop rotation. But there is a problem of timely degradation of organic matter as a source of power plants [5].

Best results are obtained when using green manuring. More efficient green manure crops (legumes, cruciferous, etc.). The Grown in the intermediate (stubble) crops using them together with organic fertilizers for row crops. When the yield of green mass of 100 – 150 kg / ha of stubble green manure on the efficiency equivalent 10-15 t / ha manure, while plowing leguminous green manure into the soil comes 50-60 kg / ha or more biological nitrogen can reduce nitrogen application rate of mineral fertilizers for the following crop [2, 5].

Mineralization of plant residues depends upon several factors: the ratio between nitrogen and hydrocarbon organic part – cellulose, pectin, lignin, dextrin, starch, sugars, etc. Of great importance is soil moisture. This causes the activity of microorganisms-destructors- cellulose-degrading bacteria, fungi. The more these processes are intense, the less there is damage to crop plants because of compounds that are secreted by plant remains at an early stage of mineralization. With sufficient nitrogen content in plant debris (2– 3%) cellulose-degrading microorganisms that feed it nitrogen (or otherwise - nitrogen fertilizer or soil) are successfully destroying tissue [5, 6].

According to A. I. Zinchenko [4] straw and straw chaff, earned to the soil (mixed with soil) to a depth of 12 – 14 cm, with the obligatory rolling (to focus the moisture in the soil layer) in 20 – 25 days expanded so much that makes it possible to apply the cultivator against weeds.

According to V. P. Hutz, I. D. Primak, M. F. Ribak [1], with plant remains of various cultures in the back ground (the total number of them yields) 27– 60,5% nitrogen, 18,5 – 51,7% phosphorus, 16,7 – 48,1% potassium, 27,6 – 54% calcium.

Chemical analysis of green and root mass shows that growing biennial white sweet clover green manure in a pair – it is 376 kg / ha nitrogen, 67 – phosphorus and 300 kg / ha of potassium. Research of the balance of nitrogen, the phosphorus and potassium have shown that most or nearly equal parts of the total plant biomass remains on the field. Thus, the flow of nitrogen in the soil is dominated by its removal with the harvest of 49 kg / ha and phosphorus and potassium – 3,4 and 20,2 kg / ha [4, 6].

Effective means of producing organic fertilizer is the use of green manure in conjunction with stubble. This agro-technical way in its performance is not inferior manure made in an amount equivalent to the contents of dry matter and nutrients [5].

According to A. I. Zinchenko [4] using by-products in combination with green manure and remnants stem of the root besides full compensation for the removal of organic matter from the main crop production, the field rotation additionally received 68,4 kg / ha of organic matter, which corresponds to 16 – 20 t / ha manure.

In general, the saturation field crop rotation legume crops in the basic and intermediate crops to allow 25–40% to 25–50% decrease of mineral nitrogen per 1 ha of land without significantly reducing the overall productivity of crop rotation and at lower production costs [2].

Therefore, the essence of biological crop - not simplify, but rather in-depth penetration into the nature agrobiocenoses based on modern scientific approaches.

Scientists A. I. Zinchenko. [5], and Y. F Tereshchenko [8] indicate a clear advantage over the other pair of green manure predecessors winter wheat in the six field crop rotation chair Uman N.U.H.

Materials and methods. The aim of our research was to study the growth and development of different varieties of winter wheat in growing them after a couple of green manure in the southern part of the right-back forest steppe.

To address the issues raised during the period 2007–2010 was laid field experiments that were carried out in the department of crop rotation Uman National University of Horticulture.

In experiment studied the effect of three factors: (A) – varieties Podolyanka, Kryzhynka, (B) – time of sowing: the third decade of September to the second week of October with an interval of 10 days, (C) – seeding rate: – 3,0 to 6,0 million p./ha seed at intervals like 1,0 million p./ha. Variations in the experiment systematically placed with three repetitions.

The preceded by – green manure pair, green manured fallow – the biennial white sweet clover. Method of sowing –usual line sowing. Land area –100 m^2, accounting – 50 m^2. Harvesting was carried by combiner "Sampo 500".

Farming winter wheat experiment in common, besides the elements studied. During the laying of the experiment and analysis of research results obtained using conventional techniques [3].

Conditions under which the research was conducted. In assessing the conditions of typicality 2007–2008 agricultural year, there was a tendency to increase unimportant temperature conditions.

However, in September and October and April temperature conditions rose to extreme number. In all other months, the temperature conditions were not significantly changed. There was a significant decrease in rainfall from June to August, and in October and January.

Temperature conditions 2008–2009 agricultural year characterized by insignificant increase in performance, but in September and October – significantly increased. Rainfall for the year was noted insignificant decrease, but in October, January and June, substantially less rain fell in September and February, the number has increased substantially.

2009-2010 agricultural year was characterized by high levels of heat and moisture, which greatly influenced the yield of winter wheat. Rainfall for the crop year fell 736,8 mm, which is 103,8 mm above the long-term average quantity. A dry period in August was, however turned out to be too rainy June.

Results and discussion. The level of productivity, its stability and quality depend on the optimal combination agricultural methods, according to soil and climatic conditions of cultivation.

Higher yield of winter wheat after green manure pair was for planting in early October and was formed at the level of grade Kryzhynka – 5,53-6,17 in grade Podolyanka 5,90-6,51 t/ha (*Table 1*).

Table 1

Yield of winter wheat depending on the variety, sowing time and seeding rate, t/ha

Grade (factor A)	Time of sowing (factor B)	Seed rate, million p./ha (factor C)	Year			Mean
			2008	2009	2010	
Kryzhynka	I (the third decade of September)	3	5,17	5,42	5,53	5,37
		4 (control)	5,48	5,66	5,77	5,64
		5	5,66	5,91	6,02	5,86
		6	5,06	5,30	5,41	5,26
	II (the first decade of October)	3	5,30	5,60	5,71	5,54
		4	5,63	5,73	5,84	5,73
		5	5,83	6,29	6,40	6,17
		6	5,41	5,54	5,65	5,53
	III (the second decade of October)	3	4,85	4,85	4,96	4,89
		4	4,88	4,98	5,09	4,98
		5	5,08	5,36	5,47	5,30
		6	4,88	5,23	5,34	5,15
Podolyanka	I (the third decade of September)	3	5,35	5,42	5,53	5,43
		4 (control)	5,49	5,67	5,78	5,65
		5	5,88	6,15	6,26	6,10
		6	5,68	5,72	5,83	5,74
	II (the first decade of October)	3	5,36	6,12	6,23	5,90
		4	6,10	6,07	6,18	6,12
		5	6,31	6,56	6,67	6,51
		6	5,88	5,91	6,02	5,94
	III (the second decade of October)	3	4,78	4,77	4,88	4,81
		4	4,93	4,94	5,05	4,97
		5	5,31	5,40	5,51	5,41
		6	5,16	5,41	5,52	5,36
HIP_{05}	*factor A*		0,11	0,11	0,12	–
	factor B		0,13	0,13	0,14	
	factor C		0,15	0,15	0,16	
	factor ABC		0,34	0,36	0,39	

Time of sowing winter wheat in the third decade of September resulted in lower yields due to excessive tillering plants in the fall. Sort Kryzhynka these figures were 5,26 – 5,86 in grade Podolyanka – 5,43-6,10 t/ha.

In the third term, that is for sowing winter wheat in the second week of October, formed in lower yield grade Kryzhynka 4,89-5,30 in grade Podolyanka – 4,81-5,41 t/ha as crops due to lack of tillering in autumn were poorly developed root system.

Higher yield of winter wheat seeding rate was at 5,0 million p./ha. Thus, in the second period Kryzhynka variety had – 6,17 in grade Podolyanka – 6,51 t/ha. A little bit lower figures resulted for the first sowing of the studied varieties for 0,31 – 0,41 t/ha.

In the third term of seed sowing at a rate of 5.0 million p./ha winter wheat formed the lowest yield. So, a variety Kryzhynka had– 5,30, Podolyanka – 5,41 t/ha, which is 0,87 – 1,10 t/ha less than in the second period.

Seeding rate, according to the studies, significantly affects the formation of yields of winter wheat. Thus, increasing the seeding rate from 3,0 to 5,0 million p./ha boosted productivity in all variants of the experiment, whereas increasing seeding rate from 5,0 to 6,0 million p./ha led to its decline as a result of excessive thickened crops winter wheat.

Conclusions.

1. Higher yield of winter wheat was obtained in the usual sowing crops for middle and early maturity variety Podolyanka in the first decade of October with the norm seeding 5,0 million p./ha, which was – 6,51 t/ha. The advantage of this sort, compared to middle maturity variety Kryzhynka was at sowing in other terms - in the third decade of September and in the second decade of October.

2. To have a yield at 5,90 – 6,51 t/ha level of clean grain of good quality, the winter wheat should be sown after a green manured fallow.

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Анотація

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Ріст і розвиток різних сортів пшениці озимої при вирощуванні їх після сидерального пару в південній частині правобережного лісостепу

Наведено результати трирічних досліджень вивчення росту і розвитку різних сортів пшениці озимої при вирощуванні їх після сидерального пару в умовах південної частини Правобережного Лісостепу.

Ключові слова: *пшениця озима, сорт, спосіб сівби, норма висіву, урожайність, якість зерна*

Аннотация

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Рост и развитие сортов различных сортов пшеницы озимой при выращивании их после сидерального пара в южной части Правобережной Лесостепи.

Приведены результаты трехлетних исследований изучение роста и развития различных сортов пшеницы озимой при выращивании их после сидерального пара в условиях южной части Правобережной Лесостепи.

Ключевые слова: пшеница озимая, сорт, способ посева, норма высева, урожайность, качество зерна