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DYNAMICS OF QUANTITATIVE AND QUALITATIVE INDICATORS OF HUMUS CONTENT IN SOIL WHEN LONG-TERM CULTIVATING WINTER RYE IN CONSTANT CROPS

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Abstract. *The main source of nutrients and energy for all living things in the soil is organic matter, thanks to which the continuous cycle of nutrients in nature is maintained. Long-term functioning of the soil in agrosystems leads to a state of equilibrium of organic matter with an appropriate level of its stability. As a result of reducing the application of fertilizers, especially organic ones, fundamental changes have occurred in the small (biotic) cycle of substances. Every year, the negative balance of humus reaches 370–400 kg/ha, and the annual decrease in its reserves exceeds 20 million tons. According to soil survey materials, in the most fertile typical black soils of the Karlivska community of the Poltava region, the humus content currently does not exceed 6.0–6.5 %, or 2.0–2.5 % less than at the time of their survey by the expedition of V.V. Dokuchaev in 1890. The problem of humus is undoubtedly one of the key ones in solving the problems of stabilizing and restoring soil fertility.*

Long-term studies with winter rye in constant crops, which are conducted at the Poltava Agricultural Research Station, make it possible to determine and generalize its influence on the dynamics of winter rye productivity. At the same time, changes in agrochemical soil indicators are also observed. As a result of the experiment on the cultivation of winter rye in constant crops, it was found that humus content in the soil is not a statistical indicator and changes in absolute values, both in the spring and summer-autumn periods, and over the years of observation. Statistical analysis of the data obtained during the studies showed a direct and inverse correlation between the humus content indicators and the hydrothermal conditions during the research. It is proposed to widely use the results of the studies in solving fundamental issues of agriculture, in deep complex studies, and for the demonstration of the role of the main factors and conditions of plant life.

Keywords: *rye, constant crops, humus content, weather conditions, correlation*

Relevance of research. The current state of the agricultural sector of Ukraine is characterized by a certain range of problems, among which the key one is the preservation and reproduction of the fertility of agricultural soils [1–5]. To determine this function, the correct choice of the main criteria is of great importance. A sufficiently informative indicator in this regard can be the content of organic carbon in the arable soil layer. Soil fertility depends on the rate of this organic matter by 85–90 %, which is essentially a form of accumulating solar energy on the Earth [6–10].

Annual decomposition, synthesis and transformation of humus, conservation and binding of nutrients in it and their continuous release and entry into the soil solution are the features of humus substances in the soil. The formation of this organic compound in the soil is a necessary basis and means for plants to obtain nutrients, as well to create an optimal ecological environment in the soil profile [11, 12].

The problem of humus is undoubtedly one of the key ones in solving the problems of stabilizing and restoring soil fertility. So these issues determined the area of the research conducted.

Analysis of the state of research and publications. The humus content influences all the properties closely related to all soil regimes, and primarily to the nutrient one. In particular, it is worth noting that 98 % of nitrogen, 60 % of phosphorus, 80 % of sulfur and a large number of other macro- and microelements accumulate in organic form, which are in organo-mineral complexes and are reliably kept from leaching [13–16]. This explains the well-known fact: the higher the humus content in the soil, the higher the productivity of plants under different weather conditions [17–20].

As a result of reducing the application of fertilizers, especially organic ones, fundamental changes have occurred in the small (biotic) cycle of substances. Each year, the negative balance of humus reaches 370–400 kg/ha, and the annual decrease in its reserves exceeds 20 million tons. According to soil survey materials in the most fertile chernozems typical of the Poltava (former Karlivsky) district of the Poltava region, the humus content currently does not exceed 6.0–6.5 %, or 2.0–2.5 % less than at the time of their survey by the expedition of V.V. Dokuchaev in 1890 [21, 22].

Research objective: to determine quantitative and qualitative changes in humus content during long-term constant cultivation of winter rye in dark gray podzolized soil.

Materials and research methods. The research was conducted in the experimental field of the Poltava State Agricultural Research Station named after M.I. Vavilov of the Institute of Pig Breeding and Agroindustrial Production of the NAAS of Ukraine in dark gray podzolized soil in the subzone of unstable moisture of the left-bank Forest-Steppe.

The experiment on growing permanent rye at the Poltava experimental field was initiated in 1884. The sowing and accounting area of the experiment is 0.4 hectares. In the entire area of the experiment, only one factor is studied – permanent cultivation of winter rye. Repetition is one-time. Agricultural technology does not change throughout the entire research period. Fertilizers, as well as chemical means of controlling weeds, diseases and pests are not used. Pre-sowing cultivation and sowing of winter rye with subsequent rolling are carried out in mid-September. The sowing rate is 6 million seeds per hectare. Over the entire historical period, 9 varieties of winter rye were sown. Varietal change was carried out after the variety was removed from zoning.

Research results and their discussion. Determining the effect of long-term constant rye cultivation on humus content in the soil shows that humus amount in the soil is not statistical and varies in absolute values, both in the spring-autumn periods and over the years of observations (Fig. 1).

Thus, if in April 2001 the humus content in the 0–20 cm soil layer was 2.58 %, then in July it decreased to 2.29 %, and in October it increased to 2.63 %. The same dynamics of the organic matter was observed by years and months and, accordingly, in percentage terms, it was equal to the following values: 2008 – 2.60; 2.30; 2.69, 2015 – 2.52; 2.22; 2.60, 2023 – 2.48; 2.29; 2.55.

These research results, in our opinion, are quite logical since the intensity of hydrolysis

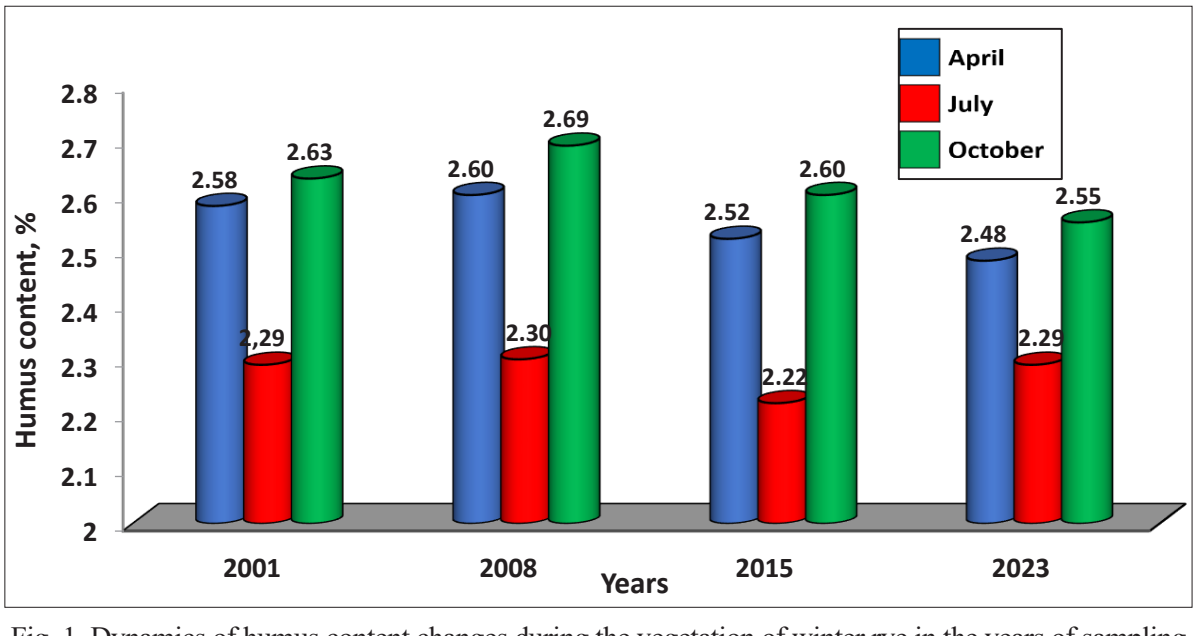

Fig. 1. Dynamics of humus content changes during the vegetation of winter rye in the years of sampling

and synthesis of organic matter is influenced by anthropogenic and natural factors. The main one is the amount of organic mass entering the soil, which directly contributes to humus accumulation in the soil. Such factors as different intensity of nutrient use from the soil by plants during their growth and development, as well as different water and temperature regimes of the soil at the time of sampling, which directly affect the intensity of hydrolysis and synthesis of organic matter, indirectly affect this process (Table 1, 2).

In addition, it is necessary to take into account that plants absorb nutrients from the soil with different intensity at different stages of their development. All this has a direct impact on the dynamics of humus content during the growing season.

When using statistical calculations and analysis of the humus content in the soil in relation to the amount of precipitation it was established the following: for the spring (March-May) and summer (June-August) periods, an average direct correlation was recorded; the correlation coefficient was r = 0.52 and r = 0.45 respectively, while for the autumn period (September-November) the correlation was average inverse, and the correlation coefficient r was −0.50.

The relationship between the humus content in soil and temperature regimes was in a somewhat different paradigm. During the spring (March-May) and summer (June-August) periods, a high negative correlation was observed and the correlation coefficient was r = −0.74 and r = −0.88 respectively. During the autumn period (September-November) the relationship was average inverse, and the correlation coefficient r was −0.62.

Long-term observations indicate that for the entire period of the experiment with the permanent rye crop, the humus content in the dark gray podzolized soil has been undergoing transformation, but this process is relatively stable.

Over the years of research, there has been a change in the qualitative indicators of humus in both 0–20 and 20–40 cm soil layers. In particular, the carbon content of humic acids during 1964, 1979, 2012, 2022 in 0–20 cm soil layer was in the following dynamics: 0.353; 0.288; 0.307; 0.294. and in 20–40 cm soil layer it was 0.258; 0.261; 0.234; 0.246 respectively. In a slightly different paradigm, this process occurred with the carbon of fulvic acids and, accordingly, by years and soil layers it had the following values: 0.306; 0.311; 0.329; 0.271 and 0.210; 0.225; 0.236; 0.220 respectively.

The ratio between the carbon of humic and fulvic acids also changed throughout the entire observation period. Thus. if in 1964 this indicator in the upper and lower layers of the soil was 1.15 and 1.26, respectively. then in 1979 it was 0.93 and 1.16, in 2012 it was 0.93 and 0.99. and in 2022 it was 1.08 and 1.12 units (Table 3). Despite the dynamics of this indicator during the research, the type of humus was static – fulvate-humate.

1. Precipitation in the years of the research, mm

Years	Months						For the year	+/– to perennials
	March-May	April	June-August	July	September-November	October		
2001	194.9	73.5	282.7	10.0	208.2	27.1	781.0	212.0
2008	152.8	58.7	129.5	27.1	125.9	31.9	491.4	-77.6
2015	172.4	38.5	168.4	8.5	54.7	2.0	539.8	-29.2
2023	132.5	77.0	221.6	67.3	226.1	82.1	732.5	163.5
Average long-term	121.0	40.0	177.0	71.0	135.0	42.0	569	x

2. Average air temperature, t °C

Years	Months						For the year	+/– to perennials
	March-May	April	March-May	July	March-May	October		
2001	9.2	11.0	20.7	18.4	7.5	6.4	8.3	0.7
2008	10.0	11.3	20.7	22.1	9.2	10.5	9.2	1.6
2015	9.9	9.4	21.1	21.6	9.8	6.7	9.8	2.2
2023	11.0	11.0	22.0	22.1	11.2	11.5	10.9	3.3
Average long-term	8.0	8.8	19.4	20.1	7.8	7.6	7.6	×

3. Composition of soil humus during cultivating winter rye in constant crops

Indicators	Years							
	1964		1979		2012		2022	
	Soil layer, cm							
	0–20	20–40	0–20	20–40	0–20	20–40	0–20	20–40
Humus content, %	2.35	1.76	2.26	1.84	2.33	1.81	2.29	1.70
Organic carbon in soil	1.47	1.02	1.30	1.97	1.42	1.19	1.38	1.15
Carbon in 0,1H H_2SO_4	0.066	0.056	0.095	0.072	0.088	0.069	0.084	0.059
Carbon in $N_4P_2O_3$ + NaOH	0.659	0.465	0.599	0.486	0.613	0.472	0.608	0.467
Carbon in humic acids	0.353	0.258	0.288	0.261	0.307	0.234	0.294	0.246
Carbon in fulvic acids	0.306	0.210	0.311	0.225	0.329	0.236	0.271	0.220
Ratio of humic acid carbon to fulvic acids	1.15	1.26	0.93	1.16	0.93	0.99	1.08	1.12

Conclusions. Based on the results of the research, it was established that during the long-term period of the experiment (with the permanent rye crop), the transformation of the humus content in the dark gray podzolized soil occurs in spring, summer and autumn periods, respectively, in the following paradigm: 2.55 %; 2.28 %; 2.62 %. Over the period of long-term observations, there has been a general trend towards a decrease in humus content in the soil when cultivating winter rye in constant crops.

Statistical analysis of the data obtained as a result of the research showed a direct and inverse correlation between the values of humus indicators and the hydrothermal conditions of the observations.

During long-term cultivation of winter rye in one place, the ratio between humic and fulvic acids was in the soil layers (0–20 and 20–40 cm) in the range of 0.93–1.15 and 0.99–1.26 respectively. These indicators correspond to the fulvate-humate type of humus.

Conflicts of interest: the authors declare no conflict of interest.

Use of artificial intelligence: the authors confirm that they did not use artificial intelligence technologies during the creation of this work.

References

1. Baliuk, S.A., Medvediev, V.V., & Zakharova, M.A. (2013). Stan gruntiv Ukrainy ta shliakhy pidvyshchennia yikh rodiuchosti v umovakh optymizatsii zemelnykh resursiv Ukrainy [The condition of the soils of Ukraine and ways of increasing their fertility in the conditions of optimizing land resources of Ukraine]. Zemlerobstvo, 85, 14–24 [in Ukrainian].

2. Baliuk, S.A., Medvediev, V.V., Vorotintseva, L.I., & Shimel, V.V. (2017). Suchasni problemy dehradatsii gruntiv i zakhody shchodo dosiahnennia neitralnoho yii rivnia [Modern problems of soil degradation and measures to achieve its neutral level]. Visnykahrarnoinauky, 8, 5–11. https://doi.org/10.31073/agrovisnyk201708-01 [in Ukrainian].

3. Hlushchenko, L.D., Kokhan, A.V., & Hanhur, V.V. (Eds.). (2015). Stan ta shliakhy pidvyshchennia rodiuchosti gruntiv Poltavskoi oblasti v suchasnykh umovakh silskohospodarskoho vyrobnytstva [The state and ways to increase soil fertility in the Poltava region in modern conditions of agricultural production]. Poltavska derzhavna silskohospodarska doslidna stantsiia im. M.I. Vavylova IS i APV NAAN. Poltava [in Ukrainian].

4. Nosko, B.S. (1999). Shliakhy pidvyshchennia rodiuchosti gruntiv u suchasnykh umovakh silskohospodarskoho vyrobnytstva [Ways to increase soil fertility in modern conditions of agricultural production]. K.: Ahrarna nauka. [in Ukrainian].

5. Kravchenko, Yu.S. (2019). Suchasnyi stan rodiuchosti ukrainskykh chornozemiv [The current state of fertility of Ukrainian chernozems]. Roslynnytstvo ta gruntoznavstvo, 10 (3), 9–41. https://doi.org10.31548/agr2019.03.029 [in Ukrainian].

6. Skrylnyk, Ye.V., Hlushchenko, L.D., & Doroshchenko, Yu.L. (Eds.). (2008). Vplyv systemy obrobitku ta udobrennia na humusnyi stan i vmist pozhyvnykh rechovyn u chornozemi typovomu [The influence of the tillage system and fertilization on the humus state and nutrient content in typical chernozem]. Ahrokhimiia i gruntoznavstvo, 68, 90–96 [in Ukrainian].

7. Zarishniak, A.S., Tsvei, Ya.P., & Ivanina, V.V. (2015). Optymizatsiia udobrennia ta rodiuchosti hruntu v sivozminakh [Optimization of fertilization and soil fertility in crop rotations]. Kyiv: Ahrarna nauka. [in Ukrainian]

8. Medvediev, V.V. (2015). Fermeru pro gruntovo- i resurso zberezhuvalni innovatsii z obrobitku [To the farmer about soil and resource-saving innovations in cultivation]. Kharkiv: TOV "Smuhasta typohrafiia" [in Ukrainian].

9. Kang, G.S., Beri, V.S., & Rupela, O.P. (2005).A new index to assess soil guality and sustainability of wheat-baseds cropping systems. Biology and Fertility of Soils, 41 (6), 389–398. https://doi.org/10.1007/s00374-005-0857-4

10. Kokhan, A.V., Hlushchenko, L.D., Len, A.Y., Olepir, R.V., & Hanhur, V.V. (2018). Transformatsyia humusa, byohennykh elementov v temno-seroi opodzolennoi pochve i produktyvnost ozymoi rzhy pry bessmennom vyrashchyvanyy. [Transformation of humus, biogenic elements in dark-gray podzolized soil and productivity of winter rye during continuous cultivation]. Vesnyk Belorusskoi hosudarstvennoi selskokhoziaistvennoi akademyy, 1, 118–121.

11. Nosko, B.S. (2006). Antropohenna evoliutsiia chornozemiv [Anthropogenic evolution of chernozems]. Kharkiv: "13 topohrafiia" [in Ukrainian]

12. Dmytrenko, V.P. (2010). Pohoda, klimat i urozhai polovykh kultur [Weather, climate and crop yields]. Kyiv: Nika-Tsentr [in Ukrainian].

13. Skrylnyk, Ye.V., Hetmanenko, V.A., & Kutova, A.M. (2018). Rozrakhunkovi modeli balansu humusu yak pokaznyka ahroekolohichnoi stabilnosti orhanizatsii zemlekorystuvannia [Calculation models of humus balance as an indicator of agroecological stability of land use organization]. Naukovi horyzonty (Scientific horizons). 7–8 (70). 139–144 [in Ukrainian].

14. Bulyhin, S.Yu., Velychko, V.A., & Demydenko, O.V. (2016). Ahrohenezchornozemu [Agrogenesis of chernozem]. Kyiv: Ahrarna nauka [in Ukrainian].

15. Baliuk, S.A., Hrekov, V.O., & Lisovyi, M.V. (Eds.). (2011). Rozrakhunok balansu humusu i pozhyvnykh rechovyn u zemlerobstvi Ukrainy na riznykh rivniakh upravlinnia [Calculation of the balance of humus and nutrients in Ukrainian agriculture at different levels of management]. Kharkiv: Miska drukarnia [in Ukrainian].

16. Lopushniak, V.I. (2012). Dynamika fraktsiino-hrupovoho skladu temno-siroho opidzolenoho gruntu pid vplyvom riznykh system udobrennia [Dynamics of the fractional-group composition of dark gray podzolized soil under the influence of different fertilization systems]. Peredhirne ta hirske zemlerobstvo i tvarynnytstvo: mizhvid. temat. nauk. zb. Lviv-Obroshyne. 54 (2) 58–64 [in Ukrainian].

17. Kohan, A., Hlushchenko, L., Hanhur, V., Samoylenko, O., Len, O., Olepir, R., Kalinichenko, S., & Kavalir, L. (2017). Unique experiment of global agriculture in the Poltava region – long-term winter rye cultivation. Agricultural Science and Practice, 4 (1), 63–69. https://doi.org/10.15407/agrisp4.01.063

18. Hlushchenko, L.D., Kokhan, A.V., Hanhur, V.V., Olepir, R.V., Len, O.I., & Breheda, S.H. (2018). Produktyvnist zhyta ozymoho za bezzminnoho vyroshchuvannia [Productivity of winter rye under constant cultivation]. Ahroekolohichnyi zhurnal, 2, 61–67. https://doi.org/10.33730/2077-4893.2.2018.157752 [in Ukrainian].

19. Dehtiarov, V.V. (2011). Humus chornozemiv Lisostepu i Stepu Ukrainy [Humus of chernozems of the Forest-Steppe and Steppe of Ukraine]. Kharkiv: Maidan [in Ukrainian].

20. Hlushchenko, L., Olepir, R., Len, O., Soroka, Y., & Saidak, R. (2024). Kukurudza na zerno u bezzminnomu posivi za riznykh system udobrennia ta pohodnykh umov [Corn for grain in a constant crop under different fertilization systems and weather conditions]. Melioratsiia i vodne hospodarstvo, 1, 91–97. https://doi.org/10.31073/mivg202401-378 [in Ukrainian].

21. Kokhan, A.V., Hlushchenko, L.D., & Olepir, R.V., (Eds.). (2018). Statsionarni dovhostrokovi polovi doslidy Poltavskoi doslidnoi stantsii im. M.I. Vavylova: Chastyna 1. [Stationary long-term field experiments of the Poltava Research Station named after M. I. Vavilov: Part 1]. Poltava: PP Astraia [in Ukrainian].

22. Kovalenko, P.I., Kysil, V.I., & Lisovy, M.V. (Eds.). (2006). Dovhostrokovi statsionarni polovi doslidy Ukrainy. Reiestr atestativ [Long-term stationary field experiments of Ukraine. Register of certificates]. Kharkiv: "Drukarnia № 13" [in Ukrainian].

23. Cimélio Bayer, Ladislau Martin-Neto, João Mielniczuk, Sérgio da C Saab, Débora MP Milori, & Vanderlei S Bagnato. (2002). Tillage and cropping system effects on soil humic acid characteristics as determined by electron spin resonance and fluorescence spectroscopies. Geoderma, 105 (1–2), 81–92. https://doi.org/10.1016/S0016-7061 (01)00093-3

24. Nadtochyi, P.P., Myslova, T.M., & Trembitskyi, V.A. (2004). Yakisnyi sklad humusu i kinetyka protsesu nitryfikatsii v gruntakh, shcho zaznaly riznoho stupenia antropohennoho navantazhennia [Qualitative composition of humus and kinetics of the nitrification process in soils subjected to various degrees of anthropogenic load]. Ahroekolohiia, 1, 11–19 [in Ukrainian].

25. Volkohonov, V.V., Brytan, T.Yu., & Pyrih, O.V. (2018). Rozvytok mikroorhanizmiv ta spriamovanist biolohichnykh protsesiv u chornozemi vyluzhenomu za modeliuvannia defitsytu svizhoi orhanichnoi rechovyny ta vplyvu mineralnoho azotu [The development of microorganisms and the orientation of biological processes in chernozem leached under the simulation of the deficiency of fresh organic matter and the influence of mineral nitrogen]. Silskohospodarska mikrobiolohiia, 28, 3–16. https://doi.org/10.35868/1997-3004.28.3-16 [in Ukrainian].

26. Kokhan, A.V., Hlushchenko, L.D., Olepir, R.V., Len, O.I., & Samoilenko, O.A. (2019). Produktyvnist riznykh sortiv i hibrydiv kukurudzy za bezzminnoho yikh vyroshchuvannia [Productivity of different varieties and hybrids of corn under constant cultivation]. Visnyk ahrarnoi nauky, 10, 18–23. https://doi.org/20.31073/agrovisnyk2019010-03 [in Ukrainian].

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ДИНАМІКА КІЛЬКІСНИХ І ЯКІСНИХ ПОКАЗНИКІВ ВМІСТУ ГУМУСУ У ҐРУНТІ ЗА ТРИВАЛОГО ВИРОЩУВАННЯ ЖИТА ОЗИМОГО В БЕЗЗМІННОМУ ПОСІВІ

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Анотація. *Основним джерелом поживних речовин і енергетичного матеріалу для всього живого у ґрунті є органічна речовина, дякуючи чому і підтримується безперервний кругообіг поживних речовин у природі. Довготривале функціонування ґрунту в агросистемах приводить до стану рівноваги органічної речовини з належним рівнем його стабільності У результаті зменшення внесення добрив і особливо органічних, корінні зміни пройшли у малому (біотичному) кругообігу речовин. Кожний рік від'ємний баланс гумусу досяг 370–400 кг/га, а щорічне зменшення його резервів перевищує 20 млн. т. За матеріалами ґрунтового обстеження у найбільш родючих чорноземах типових Карлівської громади Полтавської області у даний час вміст гумусу не перевищує 6.0–6.5 %, або на 2.0–2.5 % менше, ніж на час їх обстеження експедицією В.В. Докучаєва в 1890 р. Проблема гумусу без сумніву є однією з ключових на шляху вирішення завдань стабілізації і відтворення ґрунтової родючості. Довгострокові дослідження з беззмінним житом, які проводяться на Полтавській сільськогосподарській дослідній станції дають можливість визначити і узагальнити його вплив на*

динаміку величини продуктивності. Разом з тим ведуться спостереження за зміною агрохімічних показників ґрунту. У результаті проведення досліду з вирощування жита беззмінного було встановлено, що величина вмісту гумусу у ґрунті показник не статистичний і змінюється, в абсолютних величинах, як за весняний та літньо-осінній періоди, так і за роками спостережень. Статистичний аналіз даних, отриманих у результаті досліджень показав прямий та зворотний кореляційний зв'язок між величинами показників гумусу та гідротермічними умовами проведення досліджень. Запропоновано результати досліджень широко використовувати при вирішенні фундаментальних питань землеробства, для глибоких комплексних досліджень, демонстрації ролі основних чинників та умов життя рослин.

Ключові слова: *жито, беззмінний посів, вміст гумусу, погодні умови, кореляційний зв'язок*