UDC 631:581.5:633.1 https://doi.org/10.31867/2523-4544/0315

MOISTURE AVAILABILITY AND YIELD OF WINTER WHEAT DEPENDING ON PREDECESSORS IN THE NORTHERN STEPPE OF UKRAINE

M. M. Solodushko
State Enterprise Institute of Grain Crops of NAAS of Ukraine, 14 Volodymyr Vernadskyi St., Dnipro, 49009, Ukraine

Topicality. *In the Steppe of Ukraine, the moisture availability of winter wheat crops, as well as other winter cereals, is a key factor in satisfying the basic physiological needs of plants in the process of their growth and development. Heterogeneous moisture conditions after different predecessors lead to significant differences in plant water consumption and affect the winter wheat productivity, and this should be taken into account in production activities.* ***Purpose.*** *To determine the influence of predecessors on the water consumption of crops and the yields of winter wheat under different weather conditions in the Steppe zone of Ukraine.* ***Materials and Methods****. The study and analysis of problematic issues was carried out by the Laboratory of Agrobiological Resources of Winter Grain Crops of the SE Institute of Grain Crops of NAAS at the Synelnykove Breeding and Research Station during growing season 2017–2022. In the experiment, winter wheat of different varieties was sown after three predecessors: black fallow, peas and sunflower. Winter wheat was grown according to generally accepted technology for the Northern Steppe of Ukraine.* ***Results.*** *Moisture conditions, considering different predecessors, resulted in a significant difference in water consumption of winter wheat plants. The highest moisture consumption by winter wheat crops during the autumn growing season was observed after black fallow, which averaged 46.2 mm and exceeded winter crops after peas and sunflower by 8.8 and 15.2 mm, respectively. In the spring, with the beginning of the resumption of active vegetation, the productive moisture reserves in the 0-100 cm soil layer under winter wheat after different predecessors were quite significant (158.0–172.4 mm) and contributed to the formation of a relatively high yield. However, before harvesting, the moisture availability to plants in the 0–100 cm soil layer decreased to an average of 29.6–38.0 mm. During the growing season, the average total soil moisture consumption was 336.2 mm after black fallow, and 326.2 and 315.0 mm after peas and sunflower, respectively. The yield of winter wheat, depending on the predecessor, and therefore on the moisture availability of plants, was quite high and averaged 5.82 t/ha in the plots after black fallow, 6.09 t/ha after peas, and 4.29 t/ha after sunflower.* ***Conclusions.*** *We found that the intensity of water consumption of winter wheat depends not only on the amount of precipitation in the pre-sowing period and during its growing season, but is also determined by the predecessors of this crop, which are extremely important and effective factor in the moisture supply of plants, which directly affects the level of their productivity.*

Key words: *winter wheat, predecessors, moisture availability, weather conditions, moisture reserves, water consumption, yield*

Introduction. The Steppe zone has been and remains the leading centre of winter grain production in Ukraine. However, grain farming in the Steppe region develops mainly under systematic droughts of varying intensity, which often recur, causing significant fluctuations in grain yields both by territory and by year in general [1, 2].

There is an opinion that meteorological factors are the most variable compared to other components of the environment. The plant development, growth and yield formation processes, as well as the effectiveness of agricultural practices are largely determined by the main elements of the weather in a particular year [3–5].

The arid climate in the Steppe zone is caused not only by insufficient precipitation, but also by their uneven distribution over the months, high temperatures and, as a result, increased water consumption for transpiration and evaporation from the soil surface.

This nature of climatic conditions in this region indicates that the winter wheat (*Triticum aestivum* L.) yields are determined primarily by the moisture availability of plants during the growing season, but the decisive importance is determined by the moisture reserves at the beginning of sowing and in the early spring after

Author information:
Mykola M. Solodushko, *Candidate of Agricultural Sciences, Senior Researcher, Head of the Department of Agrobiological Resources of Grain Crops and Grain Legumes,* e-mail: solodushko.nv@gmail.com, https://orcid.org/0000-0002-6329-5227

the growth resumption. The economic performance of each of the agricultural enterprises in the Steppe region depends on the rational utilisation of solar heat and, especially, moisture [6, 7].

At the same time, the Northern Steppe is characterised by the most favourable heat and moisture ratios for steppe vegetation, however, in this sub-zone, the yield of all crops, including winter wheat, is determined mainly by the conditions of their water availability during the growing season. The main source for recharging the soil water reserves is precipitation. Groundwater provides moisture only in fields located in river valleys, where the water table is 1–2 m below the surface.

As is well known, winter wheat is quite demanding on moisture as seeds absorb water by about 50–55 % of their weight during germination. Therefore, crops are often significantly damaged by a soil moisture deficit during sowing in the early autumn, as the soil layer of 0–10 cm must contain 10 mm or more of moisture to ensure friendly and timely seedlings of this crop. The water scarcity also reduces plant tillering, spike productivity and 1000 grain weight. In general, insufficient water supply to wheat is the main factor that prevents wheat from full realisation of its productivity potential [8, 9].

The water availability of winter wheat largely depends on its predecessors, as they leave behind heterogeneous moisture conditions, which causes significant differences in plant water consumption and affects plant productivity [10–14]. In both dry and moderately wet years, the yield is directly related to the level of water consumption by wheat. As a rule, soil moisture is most efficiently utilised by plants after their predecessors, which leave more soil moisture content, especially in the topsoil. The water consumption of the main grain crop and its moisture availability are determined by many factors, in particular, the plant vegetative mass growth and the total number of plants per unit area, which largely depends on technological factors (varietal characteristics, predecessors, fertilisers, sowing dates, seeding rates, etc.), as well as productive moisture reserves in the soil at the sowing date, the duration of the growing season, and precipitation amount and distribution during this period, i.e. weather conditions, which finally determine the impact of moisture supply on the winter wheat productivity [15–17].

Given the dynamic climatic changes in recent years, which is primarily manifested in higher air temperatures and longer dry periods in the spring and summer growing season, as well as the ambiguous assessment of the importance of predecessors in the moisture supply of winter wheat during the growing season, a balance analysis and assessment of moisture consumption from the soil in different periods of the growing season of winter wheat after different predecessors were carried out.

The research was aimed at determining the influence of predecessors on the moisture availability of crops and winter wheat productivity under different weather conditions of the Steppe of Ukraine.

Materials and Methods. The scientific work was carried out according to the existing methodologies at the Synelnykove Selection and Research Station in the crop rotation of the Laboratory of Agrobiological Resources of Winter Grain Crops of the SE Institute of Grain Crops of NAAS during 2017/18–2021/22 growing seasons [18, 19]. The soil of the experimental plot was ordinary chernozem. The average humus content in the topsoil was 3.9 %, and the pH of the soil extract was 6.6. Depending on the predecessor, the nitrogen content of nitrates was 2.39–4.56 mg after seven days of composting, and the mobile forms of phosphorus and potassium (according to Chirikov) were 11.9–19.9 and 11.6–16.6 mg per 100 g of absolutely dry soil, respectively. The area of an elementary registration plot was 50 m^2, the repetition was three times.

The experiment studied different varieties of winter wheat, mainly of the steppe ecotype, after three predecessors: black fallow, peas and sunflower. Cultivation technology is common for the Northern Steppe of Ukraine. Sowing of winter wheat was carried out with SN-16 mounted seeder according to the experimental scheme, immediately after pre-sowing cultivation. Sowing was carried out in a solid row method, with a seeding depth of 5–6 cm. The optimal sowing date was 20–25 September. The sowing rate is 5.0 million germinated seeds per hectare. Harvesting was carried out with the combine harvesters ‘Sampo-130’ and ‘Wintersteiger Delta’ (2021 and 2022).

According to the analysis, during the research, the weather conditions were quite diverse both in terms of air temperature and precipitation amount, and had a significant impact on the moisture availability and productivity of winter wheat plants. As a result, reliable information on the moisture availability and water consumption of winter wheat, depending on the predecessors and abiotic factors, was obtained. The most favourable year for winter wheat in terms of atmospheric moisture was 2021, and the driest was 2018. Other years were moderately wet, with precipitation equal to the average long-term norm.

Results and Discussion. The results of the research showed that a significant difference in water consumption of winter wheat plants at the beginning of their development is due to moisture conditions after different predecessors. During the autumn growing season, the highest moisture consumption by crops was observed in areas after black fallow, which averaged 46.2 mm and exceeded winter crops after peas and sunflower by 8.8 and 15.2 mm, respectively (Table 1). First of all, this is due to the initial reserves of available soil moisture after this predecessor at the sowing date of winter wheat, which ensured timely seedlings and further powerful growth of aboveground mass of plants before overwintering.

However, moisture consumption by winter wheat plants during the autumn growing season varied over the years in a fairly wide range, in particular, in fields after black fallow – from 8.9 to 80.7 mm; after peas – from 4.9 to 85.7 mm; after sunflower – from -6.1 to 67.7 mm.

Table 1. Water balance during the autumn growing season of winter wheat depending on predecessors, mm

Year	Predecessor	Amount of precipitation from sowing to autumnal growth cessation	Productive moisture reserves in the soil layer 0–100 cm		Changes in soil moisture reserves	Total moisture consumption
			at sowing	during autumnal growth cessation		
2021	Black fallow	34.5	122	112	-10	44.5
	Peas		90	109	+19	15.5
	Sunflower		13	33	+20	14.5
2020	Black fallow	51.5	71	92	+21	30.5
	Peas		31	47	+16	35.5
	Sunflower		1	12	+11	40.5
2019	Black fallow	66.7	140	126	-14	80.7
	Peas		116	97	-19	85.7
	Sunflower		37	36	-1	67.7
2018	Black fallow	44.6	134	112	-22	66.6
	Peas		70	69	-1	45.6
	Sunflower		36	42	+6	38.6
2017	Black fallow	68.9	115	175	+60	8.9
	Peas		57	121	+64	4.9
	Sunflower		25	100	+75	-6.1
Average	Black fallow	53.2	116.4	123.4	+7.0	46.2
	Peas		72.8	88.6	+15.8	37.4
	Sunflower		22.4	44.6	+22.2	31.0

Obviously, such water consumption by winter crops depended not only on the moisture content remaining after a particular predecessor, but also on the weather conditions of the autumn period, primarily air temperature and precipitation, which caused not only the transpiration and physical evaporation of water from the soil, but also contributed to its intensive recharge. Thus, there was a temporary excess of soil moisture in the fields after sunflower before overwintering in autumn 2017.

Undoubtedly, the yield of winter wheat in the steppe zone is significantly affected by soil moisture reserves in the spring after the end of overwintering. At the same time, the moisture accumulated in the soil during the autumn-winter period depends not only on the precipitation during this period, but also on the absorption capacity of the soil, which is determined by many factors, including its predecessors.

During the research, at the beginning of the resumption of active spring vegetation, the productive moisture reserves in the one-metre soil layer under winter wheat crops after different predecessors were on average quite high (158.0–172.4 mm), which contributed to the high yield (Table 2).

However, the available moisture content in the one-metre soil layer before harvesting decreased to an average of 29.6–38.0 mm. In some years (2021), the agronomically valuable moisture in the one-metre horizon in the full grain maturity stage reached up to 142 mm under winter wheat crops on black fallow, 131 mm – after peas, and 89 mm – after sunflower in rainy weather conditions during the spring and summer. However, in the dry weather of 2020 and 2022, the moisture volume consumed by plants and lost to evaporation increased significantly, and the residual moisture amount did not exceed 0–3, 1–2, 0–7 mm, depending on the predecessors, respectively.

Table 2. Water balance during the spring-summer growing season of winter wheat depending on the predecessors, mm

Year	Predecessor	Precipitation from the resumption of spring vegetation to full grain maturity	Productive moisture reserves in the soil layer 0–100 cm		Changes in soil moisture reserves	Total moisture consumption
			during resumption of spring vegetation	at full grain maturity		
2022	Black fallow	129.3	147	3	-144	273.3
	Peas		143	2	-141	270.3
	Sunflower		132	0	-132	261.3
2021	Black fallow	272.9	171	142	-29	301.9
	Peas		162	131	-31	303.9
	Sunflower		153	89	-64	336.9
2020	Black fallow	127.0	190	0	-190	317.0
	Peas		185	1	-184	311.0
	Sunflower		162	7	-155	282.0
2019	Black fallow	148.2	161	19	-142	290.2
	Peas		167	13	-154	302.2
	Sunflower		158	20	-138	286.2
2018	Black fallow	100.6	193	26	-167	267.6
	Peas		184	28	-156	256.6
	Sunflower		185	32	-153	253.6
Average	Black fallow	155.6	172.4	38.0	-134.4	290.0
	Peas		168.2	35.0	-133.2	288.8
	Sunflower		158.0	29.6	-128.4	284.0

The total soil moisture consumption after different predecessors of winter wheat in the spring and summer period ranged from 290 mm (black fallow) to 284 mm (sunflower) on average.

There is a belief that the total water consumption of winter wheat depends on the initial moisture reserves in the soil, precipitation and meteorological conditions during the growing season. Most of the total water supply of this grain crop consists of precipitation during the growing season (except for dry growing seasons) [20, 21].

In the conducted studies, the average total moisture consumption from the soil during the growing season of winter wheat was 336.2 mm for its sowing under black fallow, after peas and sunflower – 326.2 and 315.0 mm, respectively (Table 3). Regarding the moisture consumption by winter wheat crops in the context of a particular year of research, the highest moisture consumption was in 2019/20 for winter wheat after black fallow and peas and amounted to 397.7 and 396.7 mm, respectively.

The maximum moisture consumption during the growing season (377.4 mm) was recorded when winter crops were sown after sun-

Table 3. Moisture consumption from the soil layer 0–100 cm of winter wheat during the growing season in different moisture conditions over the years depending on the predecessors, mm

Growing season	Water consumption	Predecessor		
		black fallow	peas	sunflower
2021/22	autumn period	44.5	15.5	14.5
	spring-summer period	273.3	270.3	261.3
	Total	317.8	285.8	275.8
2020/21	autumn period	30.5	35.5	40.5
	spring-summer period	301.9	303.9	336.9
	Total	332.4	339.4	377.4
2019/20	autumn period	80.7	85.7	67.7
	spring-summer period	317.0	311.0	282.0
	Total	397.7	396.7	349.7
2018/19	autumn period	66.6	45.6	38.6
	spring-summer period	290.2	302.2	286.2
	Total	356.8	347.8	324.8
2017/18	autumn period	8.9	4.9	-6.1
	spring-summer period	267.6	256.6	253.6
	Total	276.5	261.5	247.5
Average		336.2	326.2	315.0

flower in the extremely rainy 2020/21. At the same time, the lowest moisture consumption by winter wheat crops was observed in the dry 2017/18, which was 276.5 mm in areas after black fallow, 261.5 mm – peas, and 247.5 mm – sunflower.

The analysis of the soil moisture content showed that the highest water consumption was observed on winter wheat crops after the best predecessors – black fallow and peas. This is explained by many positive factors, namely the available initial moisture reserves at sowing time of winter wheat, timely emergence of seedlings, powerful aboveground mass and well developed root system of plants, which later ensured the higher yield formation compared to crops after sunflower.

The research showed that the yield of winter wheat, depending on the predecessors, and therefore on the moisture availability of plants, was high and averaged 5.82 t/ha in the variants after black fallow, 6.09 t/ha for peas, and 4.29 t/ha for sunflower (Table 4). Clearly, there was a correlation between grain yields and soil moisture consumption by winter crops, i.e. the higher the water consumption of plants, the higher the grain yield, and vice versa, the less water consumed by crops, the lower the grain yield. However, if we compare two predecessors of winter wheat that are similar in agronomic value – black fallow and peas, we see that the crops after grain legumes utilised moisture more efficiently – the moisture consumption per 1 tonne of grain was 53.6 mm, while after black fallow and sunflower – 57.7 and 68.3 mm, respectively.

Table 4. Winter wheat yield and efficiency of soil moisture utilisation depending on predecessors, 2018–2022

Predecessor	Grain yield, t/ha	Moisture consumption during the growing season, mm	Moisture consumption per 1 tonne of grain, mm
Black fallow	5.82	336.2	57.7
Peas	6.09	326.2	53.6
Sunflower	4.59	315.0	68.3
Average	5.50	325.8	59.9

Conclusions. According to the results of the conducted experiments, water consumption of winter wheat depends both on the amount of precipitation in the pre-sowing period and during its growing season, and to a large extent on the predecessors of this crop, which are extremely important and effective in ensuring the targeted use of water resources, significantly determine a noticeable difference in water consumption by plants and thereby affect their productivity.

References

1. Polovyi, A. M., Bozhko, L. Iu., Barsukova, O. A. (2017). The impact of climate change on the agroclimatic conditions of the growing season of major crops. *Ukrainskyi hidrometeorolohichnyi zhurnal* [Ukrainian Hydrometeorological Journal], *20*. 61–70. [in Ukrainian].
2. Hamaiunova, V. V., & Lytovchenko, A. O. (2017). Features of water consumption of winter wheat depending on varieties, place in crop rotation and fertilizers in the Southern Steppe of Ukraine. *Visnyk Dnipropetrovskoho derzhavnoho ahrarno-ekonomichnoho universytetu* [Bulletin of the Dnipropetrovsk State Agrarian and Economic University], *2 (44)*. 17–21. [In Ukrainian].
3. Romanenko, O. L., Konova, S. R., Solodushko, M. M., Baloshenko, S. V. (2015). The influence of agroecological factors on the yield of winter wheat in the steppe zone of Ukraine. *Ahroekolohichnyi zhurnal* [Agroecological journal], *1*. 106–114. [in Ukrainian].
4. Romanenko, O. L., Kushch, I. S., Ahafonova, A. V., Solodushko, M. M., Usova, N. M. (2019). Water availability and water consumption for growing winter wheat in arid conditions of the Steppe. *Ahroekolohichnyi zhurnal* [Agroecological journal], *4*. 59–65. [in Ukrainian].
5. Mostipan, M. I. (2005). Water consumption of winter wheat on black pair in the northern Steppe of Ukraine. *Biuleten Institutu zernogovo hospodarstva NAAN* [Bulletin of the Institute of Grain Farming of NAAS], *26–27*. 109–113. [in Ukrainian].
6. Netis, I. T. (2008). Posukhy ta yikh vplyv na posivy ozymoi pshenitsi [Droughts and their effect on winter wheat crops]. Kherson: Ailant [in Ukrainian].
7. Solodushko, M. M,. Petrushak V. Ya., Hladka A. V., Sereda I. I. (2010). Stocks of productive moisture in the soil after the restoration of spring vegetation and yield of winter wheat depending on growing conditions. *Biuleten Instytutu zernovoho hospodarstva NAAN* [Bulletin of the Institute of Grain Farming of NAAS], *38*. 29–33. [in Ukrainian].
8. Krukivska, A. V. (2008). Agroclimatic assessment of moisture supply conditions of the main grain crops in Ukraine. *Ukrainskyi hidrometeorolohichnyi zhurnal* [Ukrainian Hydrometeorological Journal], *3*. 109–116. [in Ukrainian].
9. Hudz, V. P. (2010). *Ekolohichni problemy zemlerobstva: Pidruchnyk* [Ecological problems of agriculture: Textbook]. Zhytomyr: Vyd-vo "Zhytomyrskyi natsionalnyi ahroekolohichnyi universytet" [in Ukrainian].
10. Zadontsev, A. Y., Bondarenko, V. Y., Povzyk, M. M., Klymov, A. N. (1971). Productivity of winter wheat depending on the timing of sowing after different predecessors. *Osnovnyye rezultaty issledovaniy na Sinelnikovskoy ordena Trudovoho krasnoho znameni selektsyonno-opytnoy stantsyi (1949–1969 gg.)* [The main results of research at the Synelnikove selection and experimental station (1949–1969)], *102–109*. [in Ukrainian].
11. Hanhur, V. V., Kotliar, Ya. O. (2021). Influence of predecessors on water consumption and productivity of winter wheat in the left-bank Forest-Steppe zone of Ukraine. *Visnyk Poltavskoi derzhavnoi ahrarnoi akademii* [Bulletin of the Poltava State Agrarian Academy], *1*. 122–127. [in Ukrainian].
12. Kudria, S. I., Klochko, M. K., Kudria, N. A. (2007). Moisture providing and productivity of winter wheat depending on predecessor. *Visnyk ahrarnoi nauky* [Bulletin of agrarian sciences], *11*. 23–26. [in Ukrainian].
13. Zabarna, T. A. (2019). The influence of winter wheat predecessors on the formation of water-physical properties of the soil. *Silske hospodarstvo ta lisivnytstvo* [Agriculture and forestry], *3*. 25–32. [in Ukrainian].
14. Davydenko, H. A. (2012). Influence of the predecessor and fertilizers on agrochemical indexes of soil and cropping capacity of a winter wheat. *Visnyk Sumskoho natsionalnoho ahrarnoho universytetu* [Visnyk of the Sumy National Agrarian University. Seriia «Ahronomiia i biolohiia»], *9 (24)*. 37–39. [in Ukrainian].
15. Hyrka, A. D. (2008). Water consumption by winter wheat crops depending on varietal characteristics and the level of nitrogen nutrition. *Selektsiia i nasinnytstvo* [Breeding and seed production], *95*. 143–148. [in Ukrainian].
16. Hamaiunova, V. V., Panfilov, A. V., Hlushko, T. V. (2019). Importance of nutrition optimization and variety characteristics in effective use of moisture by winter wheat in the conditions of the Northern Steppe of Ukraine. *Tavriiskyi naukovyi visnyk* [Taurida Scientific Herald], *107*. 22–28. [in Ukrainian].
17. Netis I. (2016). Vodnyi rezhym gruntu na posivakh pshenytsi ozymoi v umovakh Pivdennoho Stepu [Soil water regime on winter wheat crops in the conditions of the Southern Steppe]. *Ahrobiznes Sohodni [Agribusiness Today]*. http://agro-business.com.ua/agro/ahronomiia-sohodni/item/ [in Ukrainian].
18. Dospekhov, B. A. (1985). *Metodika polevogo opyta s osnovami statisticheskoy obrabotki rezultatov issledovaniy* [Methodology of field experience with the basics of statistical processing of research results] (5th ed. rev.). Moscow: Ahropromizdat. [in Russian].
19. Tsykov, V. S., Pickush, G. R. (1983). *Metodicheskiye rekomendacyi po provedeniyu polevykh opytov s zernovymi, zernobobovymi i kormovymi kulturami* [Methodical recommendations on caring out the field tests with cereals, legumes and feed crops]. Dnepropetrovsk: N. p. [in Russian].
20. Kyryliuk, V. P. (2018). Dynamics of reserves of productive moisture and water consumption of winter wheat in the conditions of the Right Bank Forest Steppe of Ukraine. *Visnyk Umanskoho natsionalnoho universytetu sadivnytstva* [*Bulletin of the Uman National University of Horticulture]*. http://nbuv.gov.ua/UJRN/vumnuc_2018_1_4 [in Ukrainian].
21. Zaiets, S. O., Netis, V. I. (2013). Water consumption of grain crops and soybeans depending on the conditions of moisture availability. *Zroshuvane zemlerobstvo* [Irrigated agriculture], *59*. 30–34. [in Ukrainian].

УДК 631:581.5:633.1
Солодушко М. М. Вологозабезпеченість та урожайність пшениці озимої залежно від попередників у зоні Північного СтепуУкраїни. *Зернові культури. 2024. 8 (1). 78–84.*
Державна установа Інститут зернових культур НААН, вул. Вернадського Володимира, 14, м. Дніпро, 49009, Україна

Актуальність. У степовій зоні України вологозабезпеченість посівів пшениці озимої, як і інших озимих зернових культур, відіграє надзвичайно важливу роль, оскільки є визначальним чинником у задоволенні основних фізіологічних потреб рослин у процесі їх росту та розвитку. Неоднорідні умови зволоження, які створюються після різних попередників, обумовлюють значну відмінність у водоспоживанні рослин і впливають на продуктивність пшениці озимої, це необхідно знати та враховувати у виробничій діяльності. **Мета** проведених досліджень полягала у визначенні впливу попередників на водоспоживання посівів та урожайність пшениці озимої за різних погодних умов зони Північного Степу. **Матеріали і методи.** Вивчення та аналіз проблемних питань проводилися впродовж 2017/18–2021/22 рр. на Синельниківській селекційно-дослідній станції у сівозміні лабораторії агробіологічних ресурсів озимих зернових культур ДУ Інститут зернових культур НААН. В дос-ліді пшениця озима різних сортів висівалася після трьох попередників: чорного пару, гороху та соняшнику. Технологія вирощування – загальноприйнята для північної частини Степу України. **Результати.** Умови зволоження, які створювалися після різних попередників, обумовлювали значну відмінність у водоспоживанні рослин пшениці озимої. За час осінньої вегетації найбільші витрати вологи посівами відмічалися на ділянках після чорного пару, які становили в середньому 46,2 мм і перевищували за даним показником посіви озимини після гороху та соняшнику відповідно на 8,8 і 15,2 мм. Навесні, з початком відновлення активної вегетації рослин, запаси продуктивної вологи в шарі ґрунту 0–100 см під посівами пшениці озимої після різних попередників були доволі значними (158,0–172,4 мм) та сприяли формуванню високої врожайності. Проте перед збиранням кількість дос-тупної рослинам вологи в метровій товщі ґрунту знижувалася до 29,6–38,0 мм. Впродовж вегетації середні загальні витрати вологи з ґрунту становили за сівби по чорному пару 336,2 мм, після гороху і соняшника – 326,2 та 315,0 мм відповідно. Урожайність пшениці озимої залежно від попередника, а отже і від вологозабезпеченості рослин, виявилася доволі високою та в середньому становила на ділянках після чорного пару 5,82 т/га, гороху – 6,09 т/га, соняшнику – 4,29 т/га. **Висновки.** Встановлено, що інтенсивність водоспоживання пшениці озимої залежить не тільки від кількості опадів в допосівний період і протягом її вегетації, але й визначається попередниками цієї культури, які є надзвичайно важливими та ефективними в забезпеченні рослин вологою, що безпосередньо впливає на рівень їх продуктивності.

Ключові слова: *пшениця озима, попередники, вологозабезпеченість, погодні умови, запаси вологи, водоспоживання, урожайність*