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DEPENDENCE OF THE SOFT WINTER WHEAT PRODUCTIVITY ON GROWING CONDITIONS

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Topicality. *The establishment of optimal previous crops and sowing dates in accordance with specific growing conditions is relevant, because different varieties have different biological characteristics. Therefore, an important task is to develop the best agricultural measures for each individual variety.* ***Purpose.*** *To determine the plasticity of soft winter wheat varieties, as well as the share of influence of agrotechnical measures and growing conditions on their yield level.* ***Materials and Methods.*** *We studied the dependence of winter wheat yield on the following factors: A – previous crops (5): soybean, sunflower, maize for silage, green manure fallow (white mustard), mustard for seeds; B – sowing dates (3): 25 September, 5 and 15 October; C – soft winter wheat varieties (11).* ***Results.*** *It was found that the yield level of winter wheat mainly depended on the previous crop (35.5 %) and the interaction of such factors as year conditions and previous crop (17.0 %), as well as on the variety (13.8 %). Under favourable growing conditions, the yield depended largely on varietal characteristics and sowing date, and under more extreme conditions (drought, uneven precipitation relative to the stages of crop development), the main factor was the previous crop. According to the regression coefficient, a greater response to the change in the previous crops and sowing dates (bi = 1.44–1.46) was noted in the MIP Dovira and MIP Vidznaka varieties, a smaller one – MIP Yuvileina and MIP Fortuna (the regression coefficient was 0.64–0.69). The varieties MIP Nika and MIP Darunok were most responsive to changes in growing conditions, in which the yield varied in direct dependence on agrotechnical conditions (bi = 1.01–1.03).* ***Conclusions.*** *The realization of the productivity potential and the production efficiency of winter wheat are especially influenced by organizational and economic techniques – the selection of varieties, previous crops, and optimal sowing dates. Their effect on grain yields is determined by the characteristics of a certain variety and soil and climatic conditions of cultivation. Therefore, the selection of varieties for sowing should consider their plasticity as well as the optimal previous crops and sowing dates.*

Key words: *variety, previous crops, sowing dates, yield, share of influence, coefficient of variation, regression coefficient*

Introduction. The cultivation of winter wheat (*Triticum aestivum* L.) is of crucial importance for increasing grain production. Winter wheat is grown on 220 million hectares (15 %) of the global arable land [1] and is one of the most valuable grain crops. Soil and climatic growing conditions, biological characteristics of the variety, agrotechnical and other factors have a significant impact on the yield and quality of wheat grain [2, 3]. The maximum wheat yield is formed at the optimal ratio of the impact of all factors [4].

The realisation of the genetic potential of a variety as the cheapest way to increase yields requires compliance with all the prescribed agrotechnological measures [5]. Timely replacement of the wheat variety can increase the grain yield by 40–60 % [6]. Breeders should combine high yields with a set of economic valuable characteristics, including grain quality parameters, when developing new varieties [7]. Therefore, the study of the effect of previous crops on winter wheat grain remains an important task [8, 9].

The sowing dates of winter wheat significantly change depending on the previous crops

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and weather conditions of a given year [10]. At different sowing dates, winter crops overwinter at different development stages, and therefore are exposed to different biotic and abiotic factors, which significantly affects plant growth and development and, in general, the level of yields. The highest grain yields of winter wheat are obtained at the optimal sowing date, which is set in consideration of soil and climatic conditions, variety characteristics, agricultural practices and weather conditions in the pre-sowing period [11, 12]. Different biological characteristics of varieties provide the importance of selecting the best agricultural practices for each individual variety [13]. Information on the optimal previous crops and sowing dates for each winter wheat variety is of practical importance and makes it possible to evaluate them in terms of yield and stability [14].

Wheat producers prefer varieties that are stable in different environments with good economic properties. Therefore, it is important that new varieties have these qualities in different growing conditions [15]. Genotype yields are significantly influenced by environmental conditions in terms of stability and adaptation [16]. Wheat varieties should be studied many times under different conditions for grain yield, plasticity and genotype-environment interactions, which play an important role in the stability of the variety [17, 18].

Further scientific studies of the influence of growing conditions, predecessors and sowing dates and their share of influence on grain yields are relevant in the context of the development of new winter wheat varieties. The level of yield depends and varies depending on the previous crop, foliar feeding, and mineral nutrition and, to a large extent, the weather conditions of the growing year [19].

The study was aimed at determining the plasticity of soft winter wheat varieties and the proportion of influence of agronomic practices and growing conditions on their yield level.

Materials and Methods. Agrotechnical conditions were as follows: shredded plant residues, ploughing (18–22 cm), soil surface levelling, pre-sowing cultivation (5–6 cm). Wheat seeds were treated with Vincit Forte SC (1.2 l/t). The seeding rate was 5 million seeds/ha. Sowing was carried out with SN-10 Ts plot drill. The sown area of experimental plot was 10.5 m^2, the registration area was 8.11 m^2. There was a four-fold repeating arrangement. Podolianka variety was the standard. Sowing, phenological observations and yield recording are generally accepted for wheat variety testing [20, 21].

Experimental design: *factor A* – previous crops: soybean, sunflower, maize for silage, green-manured fallow (white mustard), mustard for seeds; *factor B* – sowing dates: 25 September, 5 and 15 October; *factor C* – winter wheat varieties: Podolianka, MIP Yuvileina, MIP Fortuna, MIP Roksolana, MIP Feieriia, MIP Vidznaka, MIP Nika, MIP Darunok, MIP Aelita, MIP Aurika, MIP Dovira.

Results and Discussion. The air temperature averaged 9.8 °C during the growing season of August 2020 – July 2021, which is 0.9 °C higher than the long-term average (Fig. 1). From August to November 2020, average monthly air temperature exceeded the long-term average by 0.7–4.5 °C. In the spring-summer growing season of winter wheat, average monthly temperatures were higher than long-term averages in June and July – by 0.9 and 2.2 °C, respectively.

During the growing season from August 2021 to July 2022, the average air temperature was 9.3 °C, which is 0.4 °C higher than the long-term average. In August and November 2021, the average monthly air temperature exceeded the long-term average by 0.1 and 2.4 °C, respectively, and in September and October it was lower by 1.7 and 1.1 °C. In the spring-summer growing season of winter wheat, average monthly temperatures were 0.1–1.5 °C lower than long-term data, and only in June they were 1.4 °C higher.

The air temperature in August 2022 – July 2023 averaged 9.7 °C, which is 0.8 °C higher than the long-term average. In August and November 2022, the average monthly air temperature exceeded the long-term average by 1.2 and 1.7 °C, respectively, and in September and October it was 0.5–1.6 °C lower. In general, the temperature regime in the autumn contributed to the normal development of winter crops.

During the growing season of winter wheat, the average monthly temperatures in April, May and July were 0.2–0.5 °C lower than long-term data, while in other months they were 0.4–2.9 °C higher.

Precipitation was 905 mm from August 2020

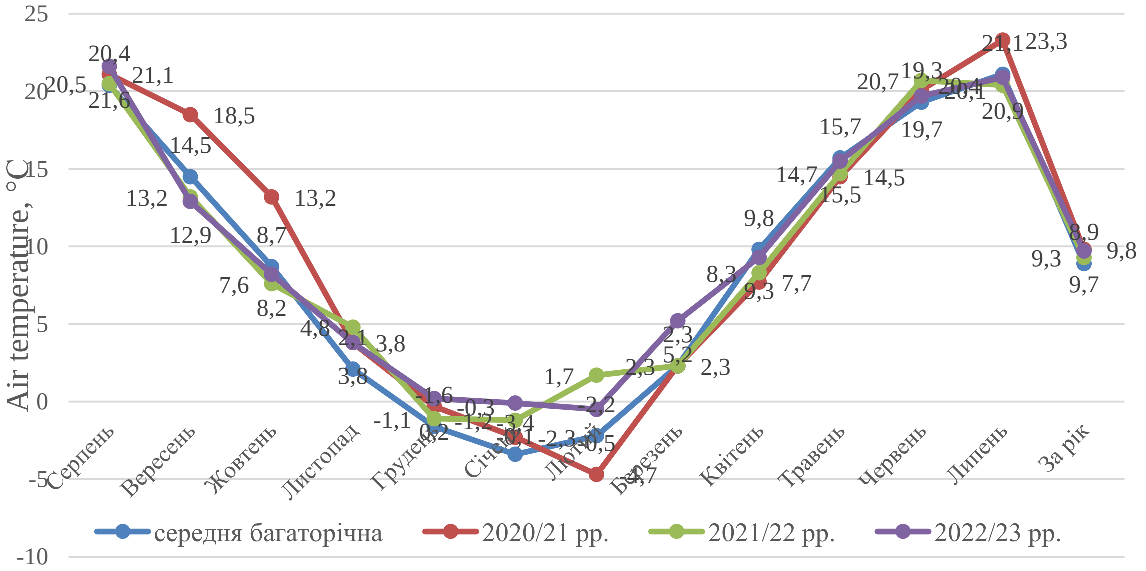

Fig. 1. Temperature conditions during the growing season of winter wheat in 2020/21–2022/23 (according to Myronivka meteorological station).

to July 2021 (147 % of the long-term average) (Fig. 2). Precipitation in late September and October contributed to the uniform wheat seedlings. During the spring and summer growing season of winter wheat, moisture was sufficient, and in May and June precipitation was 192 and 181 % of the long-term average. According to the moisture availability indicator, the growing season was classified as an excessive moisture year (HTC=1.6).

Precipitation was 663 mm from August 2021 to July 2022 (108 % of the long-term average). Precipitation was 109 mm in August (198 % of the long-term average), which contributed to uniform wheat seedlings. During the spring and summer growing season of winter wheat, a sufficient amount of moisture was observed. According to the moisture availability indicator, this growing season was classified as a mild drought year (HTC = 0.9).

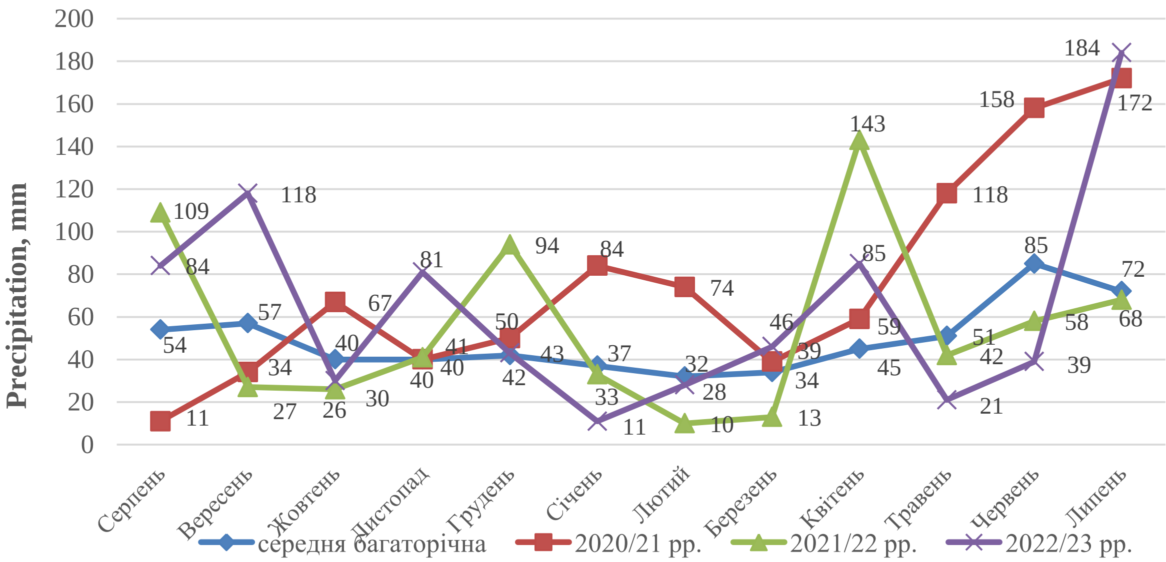

Fig. 2. Precipitation during the growing season of winter wheat in 2020/21–2022/23, (according to Myronivka meteorological station).

Precipitation was 769 mm from August 2022 to July 2023 (131 % of the long-term average). Excessive precipitation in August and September (84.4 and 117.5 mm) created optimal conditions for crop growth in the early development stages of winter wheat and contributed to uniform winter wheat seedlings. There was sufficient moisture in the spring and summer growing season of winter wheat. This growing season was considered to be optimal in terms of moisture availability (HTC = 1.5).

Grain yields of winter wheat varieties and lines varied depending on the previous crops and sowing dates. After the sunflower at sowing date of 25 September, the highest yields were obtained in varieties MIP Yuvileina, MIP Vidznaka and MIP Aelita (5.78, 5.79 and 5.74 t/ha, respectively) (Table 1).

Table 1. Winter wheat yield depending on predecessors and sowing dates, t/ha, 2020–2022

Predecessor (factor A)	Sowing date (factor B)	Variety (factor C)										
		Podolianka	MIP Yuvileina	MIP Fortuna	MIP Feieriia	MIP Roksolana	MIP Nika	MIP Dovira	MIP Darunok	MIP Vidznaka	MIP Aurika	МІП Aelita
Sunflower	25.09	5.08	5.78	5.45	5.26	5.07	5.07	4.64	5.34	5.79	5.63	5.74
	05.10	5.19	5.61	5.57	5.79	5.58	4.73	4.13	5.51	6.18	6.26	6.43
	15.10	4.84	5.09	4.94	5.42	5.08	4.75	4.31	5.10	5.28	5.90	6.13
Soybean	25.09	6.48	6.86	6.26	6.80	6.32	5.68	5.64	6.81	7.82	6.99	7.08
	05.10	5.72	6.79	6.76	6.92	5.48	5.75	6.21	7.12	7.30	7.33	6.46
	15.10	5.64	6.35	6.48	6.66	6.24	5.38	5.25	6.66	6.40	7.26	6.53
Green manured fallow	25.09	7.38	6.70	7.15	7.59	7.58	7.48	7.67	7.41	9.04	7.62	8.00
	05.10	6.70	6.79	6.47	6.90	7.51	7.14	7.88	7.32	8.73	7.18	7.79
	15.10	7.08	6.39	6.30	6.77	6.93	6.25	6.76	7.29	7.78	7.37	7.74
Mustard	25.09	6.30	5.89	5.62	6.26	5.89	5.99	5.96	6.44	7.11	6.69	6.97
	05.10	6.20	6.28	5.79	6.68	6.24	6.12	5.95	6.92	7.45	7.11	6.88
	15.10	6.14	5.81	6.10	6.25	5.42	5.64	5.89	6.08	6.72	6.57	6.27
Maize for silage	25.09	5.98	5.93	5.66	6.48	5.89	5.76	5.43	6.24	6.94	6.09	6.32
	05.10	5.55	5.82	5.42	5.56	5.14	5.03	4.87	5.58	6.08	5.84	6.11
	15.10	5.64	5.35	5.71	5.12	4.81	5.20	5.14	6.03	5.64	5.66	5.82
Average on variety		5.99	6.09	5.98	6.30	5.94	5.73	5.71	6.39	6.95	6.63	6.69

Notes: LSD_{05} for predecessors, t/ha: sunflower - 0.88, soybean - 0.97, green manured fallow - 1.05, mustard - 0.82, maize - 0.85, for all predecessors - 0.94.

The Podolianka standard-variety had a yield of 5.08 t/ha, and its yield increased to 5.19 t/ha at the 5 October sowing date. The second sowing date also contributed to higher yields for most genotypes, except for MIP Yuvileina, MIP Nika and MIP Dovira, which had higher yields when sown on 25 September.

The highest yields after the predecessor soybean were obtained in the varieties MIP Vidznaka (7.82 t/ha) and MIP Aelita (7.08 t/ha) when sown on 25 September, and MIP Darunok (7.12 t/ha) and MIP Aurika (7.33 t/ha) when sown on 5 October. The grain yield of Podolianka variety decreased from 6.48 to 5.64 t/ha due to the shifting of sowing dates to later ones. The first sowing date (25 September) contributed to the higher yields of MIP Yuvileina, MIP Roksolana, MIP Nika, MIP Aelita, MIP Vidznaka.

Sowing on 5 October resulted in higher yields for the other varieties. After green-manured fallow, Podolianka had the highest yield (7.38 t/ha) when sown on 25 September, which was the most favourable date for most varieties. The yields of MIP Dovira and MIP Yuvileina varieties increased the most after sowing on 5 October. The highest yields after this predecessor were in the varieties MIP Aelita (7.74–8.00 t/ha) and MIP Vidznaka (7.78–9.04 t/ha).

The highest yield was 7.45 t/ha in MIP Vidznaka variety sown on 5 October after mustard. This sowing date also provided higher yields for almost all varieties, with the exception of MIP Podolianka, MIP Dovira and MIP Aelita, for which the best sowing date was 25 September, and MIP Fortuna – 15 October. After the maize for silage, the highest yields were obtained in the MIP Vidznaka (6.94 t/ha) and MIP Fortuna (6.48 t/ha) varieties when sown on 25 September. This sowing date was optimal for all varieties.

The influence of agrotechnical factors on the level of winter wheat yield was determined by analysis of variance. In 2020/21–2022/23, the yield level of winter wheat mainly depended on the previous crop (35.5 %) and the interaction of the factors 'year' and 'previous crop' (17.0 %), as well as on the variety (13.8 %) (Fig. 3).

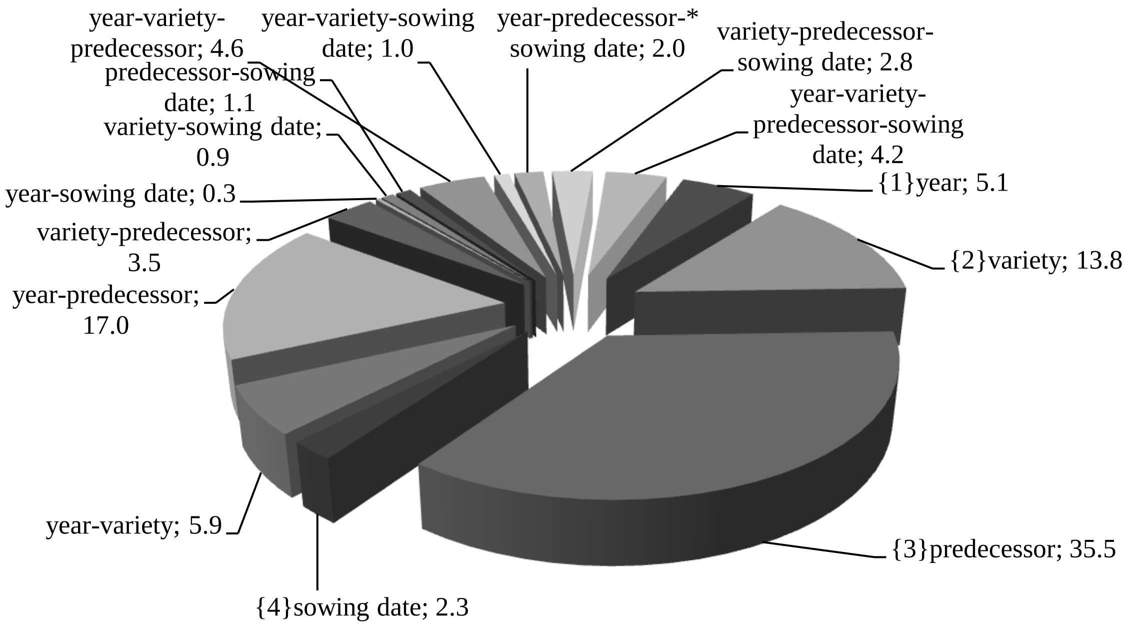

Fig. 3 Shares of factor influence on the grain yield of winter wheat, 2021–2023.

The largest share of influence in the interaction of factors was 'year – variety' (5.9 %), 'year – variety – previous crop' (4.6 %), and 'year' (5.1 %), while other factors had a minor effect on yields and ranged from 0.3–4.2 %.

In the conditions of excessively wet growing season 2020/21, the winter wheat yield mainly depended on the factor 'variety' and 'sowing date – variety' interaction, the influence shares were 11.9–41.1 and 2.6–15.7 %, respectively, depending on the previous crop.

In 2021/22, under conditions of mild drought, winter wheat yields mainly depended on the previous crop, with its share of influence amounting to 48 %, and the share of influence of the variety – 14 %. In 2022/23, winter wheat yields depended largely on the previous crop (34 %), with the share of the influence of the variety and sowing date at 10.6 % each. The winter wheat growing season of 2022/23 was classified as a year with optimal moisture supply. As a result, we can conclude that under favourable growing conditions, winter wheat yields depend on varietal characteristics and sowing date, while under more extreme conditions (drought, uneven precipitation relative to the stages of crop development) the main factor is the previous crop.

The coefficient of variation (V) of yield of winter wheat varieties ranged from 9.0 to 19.3 % (Table 2). The varieties MIP Yuvileina and MIP Fortuna were stable in terms of this indicator (V was 9.0 and 9.8 %, respectively). The MIP Dovira (V = 19.3 %) and MIP Vidznaka (V = 15.8 %) varieties were the most responsive to changes in growing conditions.

The regression coefficient (b_i), which shows the average response and plasticity of the genotype to changes in environmental factors, ranged from 0.64 to 1.46 in the experiment. A higher response to the change of previous crops and sowing dates (b_i = 1.44–1.46) was observed in the MIP Dovira and MIP Vidznaka varieties, they require a high level of agrotechnology, which will ensure maximum yield.

The lowest response to changes in growing

Table 2. Response parameters of winter wheat varieties to changes in environmental factors in terms of grain yield, 2021–2023

Variety	Yield, t/ha			Standard deviation (σ)	Coefficient of variation (V), %	Regression coefficient (b_i)
	2021	2022	2023			
MIP Yuvileina	6.37	5.81	5.81	0.55	9.0	0.64
MIP Fortuna	6.56	5.40	5.4	0.59	9.8	0.69
MIP Aurika	6.79	6.18	6.93	0.69	10.4	0.87
Podolianka (standard)	6.19	5.44	6.36	0.72	12.1	0.91
MIP Aelita	6.61	6.14	7.26	0.71	10.6	0.91
MIP Feieriia	6.31	6.05	6.53	0.72	11.4	0.92
MIP Darunok	6.25	6.00	6.92	0.77	12.0	1.01
MIP Nika	6.19	5.35	5.65	0.79	13.9	1.03
MIP Roksolana	6.05	5.53	6.26	0.87	14.6	1.11
MIP Dovira	6.29	5.29	6.14	1.10	19.3	1.44
MIP Vidznaka	6.49	6.84	7.5	1.10	15.8	1.46
average	6.37	5.82	6.43	0.78	12.6	1.0
max	6.79	6.84	7.50	1.10	19.3	1.46
min	6.05	5.29	5.40	0.55	9.0	0.64

conditions was observed in the varieties MIP Yuvileina and MIP Fortuna, with regression coefficients of 0.64–0.69. The varieties MIP Nika and MIP Darunok had the best response to changes in growing conditions, their yields varied in direct relation to agronomic conditions (b_i = 1.01–1.03).

Conclusions. The realisation of the winter wheat productivity potential and the efficiency of grain production are particularly influenced by organisational and economic practices: selection of varieties, previous crops, and optimal sowing dates. Their influence on grain yield is determined by the characteristics of a particular variety and soil and climatic conditions for growing winter wheat. Therefore, we need to take into account variety plasticity and select the optimal predecessors and sowing dates when choosing the winter wheat varieties for cultivation.

References

1. Ibrahem, N. T. (2023). A climate-crop-spectral approach for wheat adaptation with climate changes in the arid and semi-arid regions. In R. O. Wanyera, M. Wamalwa (Eds.). *Wheat. Intech Open*. doi: 10.5772/intechopen.109477
2. Oliinyk, K. M., Blazhevych, L. Y., Davydiuk, H. V. (2018). The effect of adaptive technologies of cultivation on winter wheat grain quality indices. *Kormy i kormovyrobnytstvo* [Feeds and Feed Production], *86*. 141–146. [In Ukrainian]
3. Jaisi, S., Thapa, A., Poudel, M. R. (2021). Study of correlation coefficient and path analysis among yield parameters of wheat: a review. *INWASCON Technology Magazine, 3*. 1–4. doi: 10.26480/itechmag.03.2021.01.04
4. Kovalenko, A. M., Kiriyak, Y. P. (2018). Yield and quality of seeds of different varieties of winter wheat depending on agrocultivation methods and climate change conditions. *Naukovi dopovidi NUBiP Ukrainy* [Scientific Reports of NULES of Ukraine], *5*. doi: 10.31548/dopovi-di2018.05.021 [In Ukrainian]
5. Waheeba Abdelgadir Babiker, Awadalla Abdalla Abdelmula, Hanadi Ibrahaim Eldessougi, Seif Eldin Mudawi Gasim. (2017). The Effect of Location, Sowing Date and Genotype on Seed Quality Traits in Bread Wheat (*Triticum aestevium*). *Asian Journal of Plant Science and Research, 7 (3)*. 24–28.
6. Fanin, Ya. S., Litvinenko, M. A. (2023). Yield and elements of plant productivity in modern domestic and foreign varieties of winter durum wheat. *Podilskyi visnyk: silske hospodarstvo, tekhnika, ekonomika* [Podillia Bulletin: Agriculture, Engineering, Economics], *38*. 70–77. doi: 10.37406/2706-9052-2023-1.10 [In Ukrainian]
7. Hospodarenko, H. M., Liubych, V. V., Riabovol, Ya. S., Kokhovska, I. V. (2021). Yield and grain quality of baking winter wheat of different varieties. *Naukovi pratsi Instytutu bioenerhetychnykh kultur i tsukrovykh buriakiv* [Scientific Papers of the Institute of Bioenergy Crops and Sugar Beet], *29*. 144–151. doi: 10.47414/np.29.2021.244457 [In Ukrainian]
8. Shakalii, S. M., Bahan, A. V., Yurchenko, S. O.,

Chetveryk, O. O. (2021). The influence of predecessors on yield and grain quality of new varieties of hard winter wheat. *Visnyk Poltavskoi Derzhavnoi Ahrarnoi Akademii* [Bulletin of the Poltava State Agrarian Academy], *1*. 5–71. [in Ukrainian]
9. Demydov, O. A., Khomenko, S. O., Fedorenko, I. V., Fedorenko, M. V. (2017). Evaluation of the source material of soft spring wheat according to grain quality indicators in the conditions of the Forest-steppe. *Visnyk ahrarnoi nauky* [Bulletin of agricultural science], *95 (1)*. 34–37. doi: https://doi.org/10.31073/agrovisnyk201701 [in Ukrainian]
10. Havryliuk, M. M., Kalenych, P. Ye. (2017). The reaction of new varieties of winter wheat (*Triticum aestivum* L.) to the influence of environmental factors in the conditions of the Southern Forest Steppe of Ukraine. *Sortovyvchennia ta okhorona prav na sorty roslyn* [Plant Varieties Studying and Protection], *13 (2)*. 111–118. URL: http://nbuv.gov.ua/UJRN/stopnsr_2017_13_2_3 [in Ukrainian]
11. Kryvenko, A. I., Pochkolina, S. V., Bezede, N. H. (2019). Yield and grain quality of promising winter wheat varieties at different sowing dates in the conditions of the Southern Steppe of Ukraine. *Tavriiskyi naukovyi visnyk* [Taurida Scientific Herald], *107*. 78–85. doi: https://doi.org/10.32851/2226-0099.2019.107.10 [in Ukrainian]
12. Tkachuk, V. P., Tymoshchuk, T. M. (2020). The influence of sowing dates on the productivity of winter wheat. *Visnyk ahrarnoi nauky* [Bulletin of agricultural science], *3 (804)*. 38–44. doi: https://doi.org/10.31073/agrovisnyk202003-05 [in Ukrainian]
13. Nasrallah, A. (2020). Performance of wheat-based cropping systems and economic risk of low relative productivity assessment in a sub-dry Mediterranean environment. *European Journal of Agronomy*, *113*. 1–15.
14. Pravdziva, I. V., Demydov, O. A., Hudzenko, V. M., Derhachov, O. L. (2020). Evaluation of yield and stability of soft winter wheat genotypes (*Triticum aestivum* L.) depending on previous crops and sowing dates. *Plant Varieties Studying and Protection* [Plant Varieties Studying and Protection], *16 (3)*. 291–302. [in Ukrainian]
15. Solonechnyi, P., Vasko, N., Naumov, A., Solonechnaya, O., Vazhenina, O., Bondareva, O., Logvinenko, Y. (2015). GGE biplot analysis of genotype by environment interaction of spring barley varieties. *Zemdirbyste Agric.*, *102 (4)*. 431.
16. Singh, S., Bhavani, S., Lan, C. (2014). Progress towards genetics and breeding for minor genes based resistance to Ug99 and other rusts in CIMMYT high-yielding spring wheat. *J. Integrative Agric.*, *3*. 255–261.
17. Kaya, Y., Akçura, M., Taner, S. (2006). GGE-Biplot analysis of multi-environment yield trials in bread wheat. *Turkish J. Agric. and Forest*, *30*. 325–337.
18. Verma, A., Chatrath, R., Sharma, I. (2015). AMMI and GGE biplots for G×E analysis of wheat genotypes under rain fed conditions in central zone of India. *Applied and Nat. Sci. Found.*, *7*. 656–661.
19. Gamayunova, V., Kovalenko, O., Smirnova, I., Korkhova, M. (2022). The formation of the productivity of winter wheat depends on the predecessor, doses of mineral fertilizers and bio preparations. *Naukovi horyzonty* [Scientific Horizons], *25 (6)*. 65–74.
20. *Metodychni vkazivky shchodo provedennia polovykh doslidiv z vyvchennia tekhnolohii vyroshchuvannia zernovykh kultur* [Methodical guidelines for conducting field experiments on the study of technologies for growing grain crops]. (2003). IZ UAAN. Chabany, 22 p. [in Ukrainian]
21. Volkodav, V. V. (2000). *Metodyka derzhavnoho sortovyprobuvannia silskohospodarskykh kultur* [Methodology of state variety testing of agricultural crops]. Kyiv, 100 p. [in Ukrainian]

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Актуальність. Встановлення оптимальних попередників і строків сівби залежно від конкретних умов вирощування є актуальним, адже різні сорти мають неоднакові біологічні особливості, тому важливо віднайти найкращі прийоми агротехніки для кожного окремого сорту. **Мета.** Визначити пластичність сортів пшениці м'якої озимої та частки впливу агротехнічних заходів і умов вирощування на рівень їх урожайності. **Матеріали і методи.** Вивчали залежність урожайності пшениці озимої від таких факторів: А – попередники (5): соя, соняшник, кукурудза/МВС, сидеральний пар (гірчиця біла), гірчиця/насіння; В – строки сівби (3): 25 вересня, 5 і 15 жовтня; С – сорти пшениці м'якої озимої. **Результати.** Встановлено, що рівень урожайності пшениці озимої залежав переважно від попередника (35,5 %) і взаємодії факторів «рік» і «попередник» (17,0 %), а також від сорту (13,8 %). За сприятливих умов вегетації урожайність найбільше залежала від сортових особливостей та строку сівби, а за більш екстремальних умов (посухи, нерівномірності випадання опадів відносно періодів розвитку культури) головним фактором виступав попередник. За коефіцієнтом регресії більшу реакцію на зміну попередників та строків сівби (b_i = 1,44–1,46) встановлено у сортів МІП Довіра і МІП Відзнака, меншу – МІП Ювілейна та МІП Фортуна (коефіцієнт регресії становив 0,64–0,69). Найкраще на зміну умов вирощування реагували сорти МІП Ніка і МІП

Дарунок, у яких урожайність змінювалась в прямій залежності від агротехнічних умов (b_i = 1,01–1,03). **Висновки.** На реалізацію потенціалу продуктивності і ефективність виробництва зерна пшениці озимої особливий вплив мають організаційно-господарські прийоми – добір сортів, попередників, оптимальних строків сівби. Їхній вплив на урожайність зерна визначається особливостями певного сорту та ґрунтово-кліматичними умовами вирощування. Тому при виборі сортів для посіву потрібно враховувати їх пластичність і підбирати оптимальні попередники та строки сівби.

Ключові слова: *сорт, попередник, строк сівби, урожайність, частка впливу, коефіцієнт варіації, коефіцієнт регресії*