

Influence of environmental factors upon productivity of new grades of winter wheat in conditions of South Forest-Steppe

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The purpose. To analyze influence of different factors upon productivity of new grades of winter wheat in conditions of South Forest-Steppe of Ukraine. **Methods.** Measuring-weight, statistical, dispersion and regression. **Results.** All probed grades were characterized by high productivity at seeding 5,5 million seeds/hectare on October, 5. Three factors: year of growing (49,4%), genetic potential of the grade (34,4) and seeding rate (7,4%) totally form 91,4% of grain yield of winter wheat of the probed grades at growing in conditions of South Forest-Steppe. The highest level of productivity of seeds for years of researches has ensured the grade Astarta (9,36 t/hectare), and the least — the standard grade Bogdana in the best alternative (5,55 t/hectare).

Key words: *grade, wheat, factor, Astarta, Bogdana, rate, time, method of sowing.*

In the current economic conditions stable development of agriculture is a priority in national development because it provides people with food, raw materials industry and large export opportunities. However long extensive development of the agricultural sector in Ukraine, striving to reach the highest in agriculture with insufficient taking into account the principles of environmental protection, conservation of natural resources, introduction of technologies with wide-complex machines led to increased pressures on agrosphere: excessive plowing territory exhaustion and degradation of land resources, pollution, increased environmental threats and negative scales effects on adjacent territories significant transformation of natural landscapes, depletion of biological and landscape diversity.

To obtain high and stable yields in a given agroecological zone is important to use plant varieties that are directly created by means of targeted selection passed qualification examination of plant varieties as the final stage of the selection process in which developed and evaluated varietal technology. It is extremely important criteria for selection of varieties is their flexibility, winter and holodostiykosti degree, intensity, stability and tolerance to pests, extreme environmental factors. It is under these conditions can realize as much as possible the genetic potential of varieties [1-6].

An important direction of breeding in Ukraine is to create varieties with high ecological plasticity. Research of new varieties in different soil and climatic conditions made it possible to show that the highest environmental adaptability in various subdivisions, micro and geographical locations are, newly registered varieties that are able to form a stable high yield [3-10].

Numerous studies have found that sowing winter wheat affect winter hardiness, overall survival, water and plant productivity. From early to late sowing consistently reduced the accumulation of dry matter, energy plants and reduced tillering intensity of extinction of plants and stems during the spring and summer growing season. For optimum sowing plants "zaprogramovuyutsya" in high yield. Plant productivity decreases both in early and in late sowing [3-15].

The productivity of winter wheat crops is significantly influenced by the norms of seeding, because the yield of this culture decreases both with liquefied and with thickened stem. In the thickened crops as a result of low light on IV-V stages of organogenesis significant part of shoots and whole plants die, and those that survived, slowing the development, formed a shrunken corn and ultimately - yield decreases. Plants thickened crops of winter wheat stretched, poorly prepared for the winter, more damaged by pests and diseases are prone to lodging [6-13].

Unjustified increase seeding rate reduces their potential performance culture. Liquefied crops yield decreases due to underutilization feeding area and more weed-infested crops. At low seeding rules, resulting in strong tillering and lack of batteries and water, the formation of a large number pidhonu that does not produce full grain [14-19].

The seed rate is directly related to the sowing dates. When sowing in the early stages of the plant is well busy and form a normal stalk at lower seed rates. The yield to a lesser extent depends on the number of plants, and more on the number of productive shoots [19-26].

The purpose of research. Set factors influence the level of economic productivity and quality of seeds and the individual response of winter wheat seed for the ecological system, which would form a genetically based potential class.

The methodology for conducting research involves conducting research on typical intensive technology of growing winter wheat for the zone of accommodation of the farm.

Basic research methods: measurement and weight - to determine the yield seeds; statistical, variance and regression - to identify the reliability of the results of experiments. Synthesis, the use of conventional techniques and calculations results of research conducted „ The method of analysis of variance” after Dospiekhovym B. A. [27] and program „STATISTICA”.

The object of the research were varieties created Institute of Plant Physiology and Genetics National Academy of Sciences of Ukraine: Bohdana, Slavna, Chorniava and Astarta.

Studies conducted over the years 2011-2014 AF «Olhopil» (Vinnytsia region.) On scientific and technological ground varieties and technologies 3x repeated, scheme study are shown in Table 1 and industrial crops.

Table. 1. Schematic of the experiment (factors) during 2011-14 years.

1	2	3	4	5
Sort	Method of planting	Seeding rate of seeds million units/ha	Term crop	Year
	Unexceptional	2,5-3	15 September 25 September 5 October	2012-2014
		4	15 September 25 September 5 October	
		5,5	15 September 25 September 5 October	
	With wide aisles	2,5-3	15 September 25 September 5 October	
		4	15 September 25 September 5 October	
		5	15 September 25 September 5 October	

The results of research. During the research period, weather conditions greatly differed both temperature conditions and by rainfall, but the main requirement was stable yield varieties for years.

During the study in terms of "productivity" grain wheat received results from 684 plots for total reliability and are grouped around was analyzed and calculated impacts NIR_{05} share between them and their impact in the overall yield.

When analyzing the influence of factors (Table. 2) to the total yield, it should be noted that in NIR_{05} quantity of the main factors is 0,02-0,03, indicating a significant value between their repetitions and variations, and factors "seeding method" in the sense NIR_{05} - impact factor of 0.02 between the two methods is not significant. Thus NIR_{05} values of the major factors studied confirms the high level of reliability in research. Among the factors were highlighted as a factor "other" which is 0.19 NIR_{05} .

Table. 2. The impact of factors on the level of productivity of winter wheat (2011-14 years).

Factor	Impact factor	Average for 2011-2014				NIR ₀₅ t/ha	Fraction, %
Yield, t/ha							
Year		2012	2013	2014			
		4,56	6,20	7,32		0,02	49,6
Sort		1	2	3	4		
		4,89	5,87	5,88	7,47	0,03	34,4
Method of planting	N	1	2				
		6,02	6,04			0,02	3,9
Seeding		1	2	3			
		5,69	5,96	6,44		0,02	7,4
Term crop		1	2	3			
		6,00	5,92	6,17		0,02	4,3
Other						0,19	0,4
N - the impact factor is not significant							

Ps. The average yield per year is the grain yield calculated as the average for all factors for the given period.

In analyzing the contribution of each factor in the yield component see table. 2 and fig. 1, a pattern evident that almost $\approx 50,0\%$ in yield formed by weather and climatic conditions, the growing 34,4% depending on the genetic potential of varieties and 7.4% of normal seed. At the time and method of planting, and others totally accounted for 8.6%. Thus only two factors described from 6 to have a major influence on the formation of winter wheat yield at 84% over 3 years, whereas the other 4-shaping factors in the total yield accounted for only 16%.

When comparing seeding and planting deadlines established that all varieties characterized by the highest yields for seeding 5.5 million units/ha 5 October. According to the rules seeding 5.5 million units / ha for sowing varieties between 15 and 25 September the difference in yield was negligible. The lowest yield in varieties and norms seed sowing period was characterized by Sept. 25 and only Astarta grade is 15 September. For three years the highest yield variety seeds provided winter wheat Astarta 9,36 t/ha, and the lowest - in standard grade Bohdana preferably 5.55 t/ha.

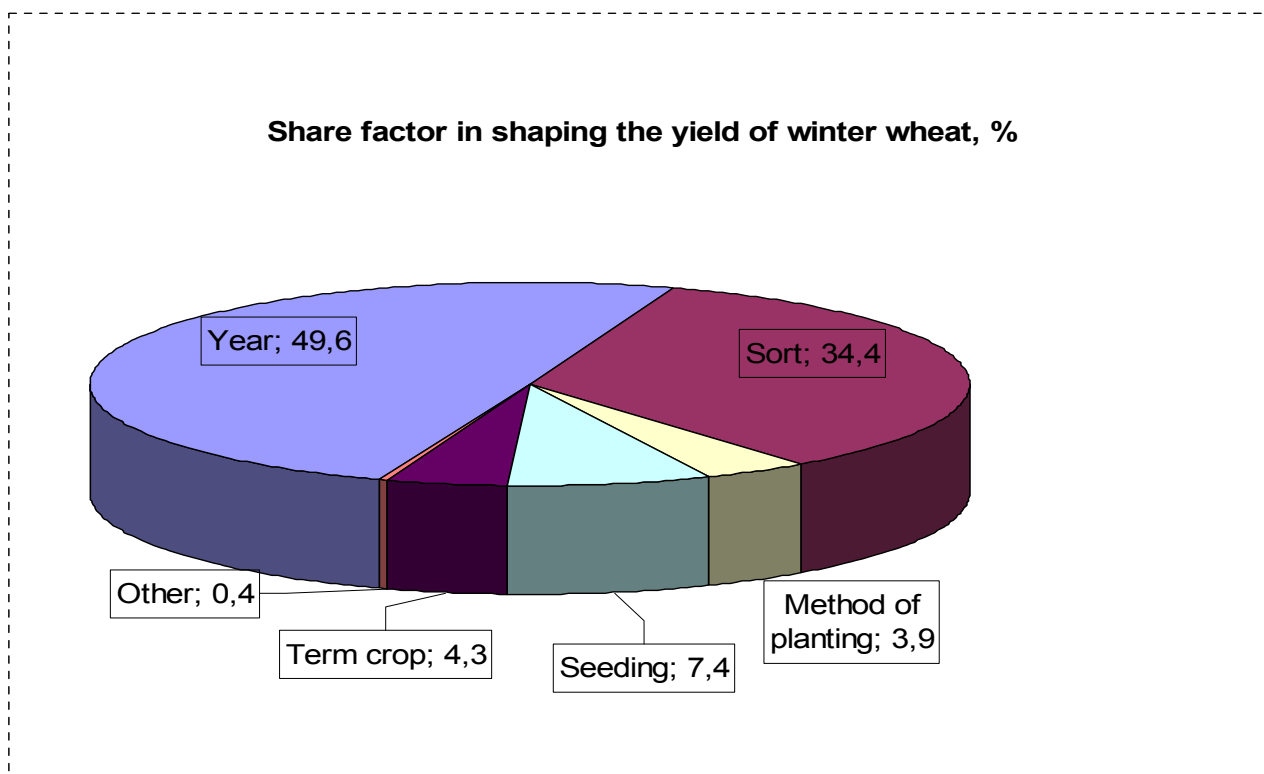


Fig. 1. Share a factor in shaping the yield of winter wheat in 2011-14, respectively.

Conclusions

1. NIR_{05} in quantitative terms, 5 th factors was 0,02-0,03, indicating a significant value between their repetitions and variations, and the factor "method of planting" in the sense NIR_{05} - impact factor of 0,02 between the two methods is not essential.
2. Three factors (growing year - 49.4% genetic potential class - 34.4 and seeding rate 7.4%) 91.4% form the total grain harvest of winter wheat grown in conditions of southern forest-steppe.
3. All varieties studied were characterized by the highest yields for seeding 5.5 million units/ha 5 October.
4. According to the rules seeding 5.5 million units/ha for sowing varieties between 15 and 25 September the yield difference was not significant.
5. The highest seed yield years of research provided a variety of winter wheat Astarta 9,36 t/ha, and the lowest - in standard grade Bohdana preferably 5.55 t/ha.

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