



UDC 631.11 / 14 "324": 632.938: 631.53.04

## INFLUENCE OF WEATHER CONDITIONS ON THE DURATION OF THE PRE-EMERGENCE PERIOD AND FORMATION OF WINTER TRITICAL SEEDLINGS DENSITY

### ВПЛИВ ПОГОДНИХ УМОВ НА ТРИВАЛІСТЬ ДОСХОДОВОГО ПЕРІОДУ ТА ФОРМУВАННЯ ГУСТОТИ СХОДІВ ТРИТИКАЛЕ ОЗИМОГО

**Svystunova I. Свистунова І.**

*PhD / / к. с.-г. н., доц.*

**Baranivskiy O. / Баранівський О.**

*Student / студент*

*National university of life and environmental sciences of Ukraine, Kyiv*

**Poltoretskyi S. / Полторецький С.**

*d. a. s., professor / д. с.-г. н., професор*

*Uman national university of horticulture, Uman, Ukraine*

**Hudolij L. / Худолій Л.**

**researcher, k.a.s. / с. н. с., лк.с.-г.н.**

*Ukrainian Institute for Plant Varieties Examination, Kiev*

**Annotation.** This article presents the results of research to study the impact of technological methods of cultivation on the duration of the pre-emergence period and the formation of seedling density of winter triticale. It is established that the most expedient is the sowing of culture in the period from 5 to 15 September, which allows you to get a quick and synchronous seedlings.

**Key words:** triticale, rye, wheat, sowing period, variety, pre-emergence period, germination, hydrothermal resources.

### **Introduction.**

Effective functioning of farms specializing in livestock production is impossible without well-established feed production, because it is not only a source of realization of genetic potential productivity of animals and birds, but also from an economic point of view - an important source of formation of the cost of manufactured product. The proportion of feed in the cost of milk is 40-60%, cattle meat and pork - 65-75 [1].

Today, along with the organizational factors that led to the decline in feed production, an important role is played by environmental conditions on Earth, which have deteriorated sharply in recent years. As a result, modern technologies for growing cultivated plants began to fail, which significantly disrupted the annual stability of their productivity [8]. To provide the population with complete food in such conditions, it is important to search crops with more stable yields, and ways to prevent extreme weather events and ways to control the growth and development of plants [9]. In this aspect, a significant role is played by annual forage plants, including winter triticale [8, 10].

Triticale - a culture of multifunctional use is resistant to adverse agroecological conditions, less demanding of growing conditions and is characterized by a high adaptive level, which contributes to a fuller realization of potential productivity [3].

When growing high and stable yields with good quality products, it is very important to obtain and maintain timely and complete seedlings of optimal density.

The most decisive, according to many researchers [5, 7], agrometeorological factors that determine the duration of the sowing-seedling period are soil moisture,



the temperature of air and topsoil. Since the soil temperature in autumn has a close correlation with air temperature, only air temperature is usually used to characterize the conditions of growth and development of winter crops [6]. However, according to J. Bayer and other researchers [2], temperature at this time is not a limiting factor. According to them, the emergence of seedlings is more influenced by moisture, its excess or deficiency, because water is the main activator of life processes in the grain, as it serves as a source of oxygen for respiration and mobilizes enzymes that break down spare compounds complex of grains in substances that soluble in water that are transported to the seedling. Moreover, for swelling and germination is important not only the presence of water near the grain, but also a certain amount, the need of which depends significantly on the species and variety.

For germination of triticale seed, it must absorb moisture within 42-60% of its weight [4], which is subject to stocks of productive moisture in the plowing layer of soil at 30-50 mm [3]. When the content of moisture in the soil layer 0-10 cm less than 10 mm germination depends on rainfall.

With sufficient reserves of productive moisture in the soil, the timely emergence of triticale seedlings is observed when the average daily air temperature is in the range of 14-16 °C. Sowing in this period allows you to accumulate the required amount of average daily temperatures equal to 120 °C. Under such conditions, seedlings appear in 4-7 days, depending on the culture [4].

The aim of the research was to establish the influence of hydrothermal resources on the duration of the pre-emergence period of winter triticale in the Forest-Steppe conditions of the right-bank Ukraine.

**Materials and research methods.** Field experiments were conducted at the "Agronomic Research Station" of the National University of Life and Environmental Sciences of Ukraine on chernozems of typical low-humus medium loam.

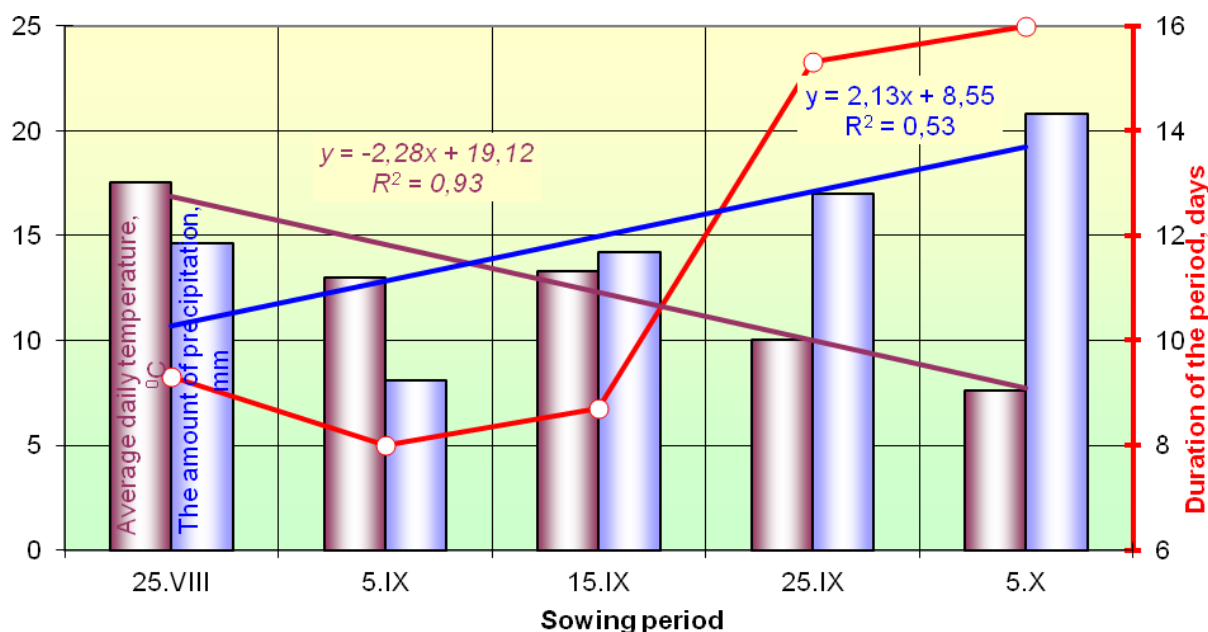
Object of research: wheat Polesskaya 90 (control), Kievskoe feed rye (control) and triticale varieties (AD 3/5, AD 44, ADM 9, Polesskiy 29 ADM 11 AD 52), sown in five calendar dates: 25 August, 5, 15, 25 September and 5 October. The predecessor is corn for silage.

### **Research results and discussion.**

The shortest time from sowing to emergence of winter triticale was observed for sowing from August 25 to September 15 - 7.0-8.3 days. The average daily temperature from sowing to germination was 13.0-17.5 °C. The influence of the average daily temperature and the amount of precipitation on the duration of the period from sowing to the emergence of winter triticale seedlings is shown on Fig. 1.

Quantitative influence on the duration of the sowing-seedling period of triticale of these factors can be easily determined both by regression equations and by using the graph itself. The level of reliability of approximation of these equations is higher than the average daily temperature factor (coefficient of determination  $R^2 = 0,93$ ), that this factor can more accurately predict the duration of the sowing-seedling than rainfall.

The hydrothermal coefficient (HTC) is an integral indicator that characterizes the inflow and evaporation of moisture over a certain period of growth and development of winter crops.



**Fig. 1 Dependence of the duration of the period of sowing and germination of winter triticale on average daily air temperature and precipitation**

There are very close positive relationships between HTC and sowing-seedling period:

- for winter triticale  $r = 0,86$ ;  $R^2 = 0,88$ ;  $y = 5,42 + 2,05x$ ;
- for winter wheat  $r = 0,81$ ;  $R^2 = 0,65$ ;  $y = 7,19 + 1,76x$ ;
- for winter rye  $r = 0,97$ ;  $R^2 = 0,93$ ;  $y = 4,70 + 1,86x$ .

Thus, the almost functional relationship between HTC and the sowing-germination period is established in rye and close - in triticale and wheat. As follows, taking into account the HTC, the duration of the sowing-seedling period can be predicted by certain regression equations; the reliability of the approximation according to these equations is from 65% for winter wheat to 93% for winter rye.

In the process of seed germination and emergence shaped stand density of plants, which largely determines the conditions for further growth and development of plants and crop productivity in general. Among the factors that determine the density of seedlings, an important place belongs to the field germination, which in the natural environment is lower than in the laboratory [5].

**Field germination of winter triticale depending on sowing date and variety, %**

Culture, variety	Sowing period				
	25.08.	5.09.	15.09.	25.09.	05.10.
Rye (control)	85,7	93,0	89,3	79,4	74,5
Wheat (control)	81,7	88,9	86,0	76,3	70,1
AD 3/5	83,4	88,9	88,4	78,5	72,3
AD 44	80,9	87,8	86,3	77,3	71,6
ADM 9	78,3	84,6	83,7	74,7	69,2
Polissya 29	83,8	90,0	89,1	79,8	74,0
ADM 11	84,3	90,9	89,1	78,4	71,7
AD 52	80,0	86,1	86,9	75,4	70,8



According to our research (table), the field germination of winter triticale depended more on varietal characteristics and weather conditions that developed in the pre-emergence period, and, accordingly, on sowing dates than on the species of plants.

On average, over the years of research, the highest field germination on triticale, rye and wheat crops was observed for sowing from 5 to 15 September. On October crops, the germination did not exceed 69.2-74.0%, which was due to the long pre-emergence period at low temperatures and excessively wet soil in some years.

### Conclusions.

Therefore, given the study of the influence of sowing dates and biological characteristics of the variety on the duration of the pre-emergence period and the formation of seedling density of winter triticale, the most appropriate is sowing winter triticale from 5 to 15 September, which allows you to get fast and synchronous seedlings.

### References:

1. Archipenko F.M. Status and trends in feed production. *Agronomist*. 2005. № 4. p. 18-22
2. Bayer J., Bures R., Tsoufal V., Fabry A. and others. Weather and harvest M.: VO "Agropromizdat". 1990. p. 332.
3. Bilytyuk A.P. Triticale is a culture of great potential for animal husbandry. *Feed and feed production*. 2003. № 51. p.149-152.
4. Bilytyuk A.P., Girko V.S., Kalenskaya S.M. Triticale in Ukraine: monograph / ed. A.P. Bilytyuk. Kiev. 2004. 376 p
5. Kalenskaya S.M. Models of cultivation technologies are a factor of stability of triticale grain production. *Coll. Science. etc. Institute of Agriculture UAAS. Kiev*. 2000. Vol. 2. p. 119-123.
6. Moiseychik V.A. Agrometeorological conditions and overwintering of winter crops. L.: Hydrometeoizdat. 1975. 295 p.
7. Netis I.T. Terms of termination of autumn vegetation and productivity of winter wheat. *Bulletin of Agricultural Science*. 2005. № 9. p. 28–30.
8. Podobed L.I. Perspective directions of improvement of fodder production in Ukraine. *Feed and feed production*. Vinnitsa. 2002. Vol. № 48. p. 3-7.
9. Rakhmetov D.B. The role of new crops in ensuring the sustainable development of feed production in Ukraine. *Feed and feed production*. Vinnitsa. 2003. № 51. p. 142-145.
10. Trunov N.P., Zabolotskaya G.E., Sazonov V.M., Fedorov A.K. Triticale is a valuable high-yielding crop. *Feed production*. 2000. № 1. p. 22-24.

**Анотація.** В даній статті викладені результати досліджень щодо вивчення впливу технологічних прийомів вирощування с на тривалість досходового періоду та формування густоти сходів тритикале озимого. Встановлено, що найбільш доцільним є сівба культури в період з 5 до 15 вересня, що дозволяє отримати швидкі та дружні сходи.

**Ключові слова:** тритикале, жито, пшениця, строк сівби, сорт, досходовий період, схожість, гідротермічні ресурси.

© Svystunova I., Baranivskiy O., Poltoretskyi S., Hudolij L.