HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

UDC 633.112.9:631.811.1:581.132

PRIMARY SOURCES WITH HIGH CONTENTS OF CHLOROPHYL AND NITROGEN IN TRITICALES IN CLOUDY FIELDS

N.J.Umirov PhD
K.T.Isakov PhD
Sh.X.Oripov PhD
J.S.Mavlanov PhD
Scientific Research Institute of Rainfed Agriculture

Abstract. This article presents the results of research conducted in 2026 on triticale varieties and samples in rainfed areas.

According to the research results, the highest chlorophyll and nitrogen content was found in the samples Plot 61 VAR 49, Plot 13 VAR 17, Plot 1 VAR 15, and No. 27/2011 compared to the standard Farkhod variety of triticale on rainfed lands; these samples exhibited high photosynthetic activity and possessed the ability to effectively absorb and accumulate nitrogen.

These genotypes possess high physiological activity and can be recommended as promising starting materials for the effective use of nitrogen in breeding work. Conversely, the low nitrogen content in the Svat and Plot 44 VAR samples may limit their breeding value for this trait.

Keywords: rain-fed land, triticale, variety, sample, chlorophyll, nitrogen, leaf, primary source**.**

Introduction. Today, the impact of climate change, drought, high temperatures, and increased soil salinity observed worldwide and in our republic pose a serious threat to the stability of agriculture in desert and semi-desert regions. Especially in fodder crops, water shortages and salt stresses disrupt physiological processes and lead to a sharp decline in yield. Most existing varieties are insufficiently resistant to extreme abiotic factors, and traditional breeding methods require a lot of time to create a new variety. Therefore, creating varieties of fodder crops resistant to drought and heat, suitable for high-yielding rainfed areas, is an urgent task.

Besaliev I.N., Panfilov A.L. (2023), and Novikova A.A. et al. (2022) note that chlorophyll content indicates the physiological state of plants and is a quantitative indicator of photosynthetic capacity, most fully reflecting the productivity process [1, 5]. Chlorophyll functions to capture light energy and transmit it to other molecules involved in the synthesis of organic compounds. This pigment is important for maintaining the balance of oxygen and carbon dioxide (CO2) in the atmosphere and is a necessary factor for plant life (3).

Photosynthesis lies at the heart of the productivity process in cereal crops. It is the primary energy accumulator and the primary source of organic substrates necessary for crop formation [4, 6, 7]. The main component of the photosynthetic complex is chlorophyll, which plays a leading role in the process of photosynthesis as a green pigment of plants and is an important factor in the metabolism of the entire plant organism [2,6].

Resolutions of the President of the Republic of Uzbekistan No. UP-5853 dated October 23, 2019, "On the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030," and No. PP-106 dated January 28, 2022, "On Additional Measures for the Further Development of Seed Production of Agricultural Crops." ensuring the mutual integration of science, education, and production in the field of selection and seed production of agricultural crops, and establishing the seed production of local selection varieties of vegetables, melons, legumes, fodder, and oilseeds.

Pursuant to Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 438 dated July 14, 2025, a number of tasks have been defined for the creation of new varieties of fodder crops

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

adapted to various soil and climatic conditions, high-yielding, with high oil content and consumer quality, resistant to salinity, drought, diseases, and pests, as well as the establishment of a primary seed production system.

Research methods. For the purpose of testing 16 varietal lines of local and imported triticale with valuable morphological, biological, and economic traits and properties for scientific experimentation, they were planted in 4 replications on 25 m2 of the experimental field of the Research Institute of Rainfed Agriculture. All field experiments were conducted based on the methodological guidelines adopted by the State Commission for Variety Testing of Agricultural Crops (1985, 1989) and developed by the Research Institute of Rainfed Agriculture (2004), while the assessment of variety samples was carried out according to the methodological guidelines of the international classifier developed by the Russian Institute of Plant Industry.

(1980), and the dispersion mathematical analysis of the experimental data was performed according to the method of B.A. Dospekhov (1985).

Research results. In the current research year, phenological observations and analysis were conducted on the valuable morphological, biological, and economic traits and characteristics of 16 local and imported triticale line varieties in rainfed areas.

In the year of the study, 16 triticale samples were obtained from rainfed areas based on the chlorophyll content (%) in the plant's leaves, and Farkhod was selected as the standard variety. The average chlorophyll content in the Farkhod standard variety was 52.1%. When comparing the remaining samples with this indicator, the following results were obtained (Figure -1).

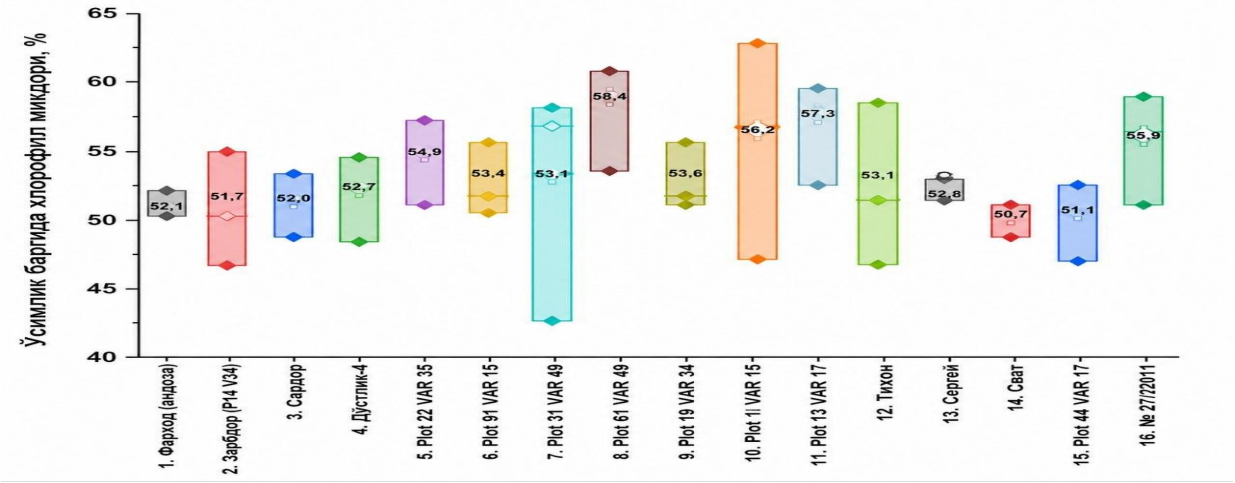


Diagram -1. Chlorophyll content in the leaf of a triticale plant

According to the results of the scientific analysis of the research, the leaf chlorophyll content in the Farkhod standard variety was 52.1%. Compared to this indicator, the chlorophyll content in the Zarbdor (R14 V34), Sardor, Svat, and Plot 44 VAR samples was lower, decreasing by 0.1–1.4%, respectively. This situation indicates that the photosynthetic activity of these samples may be slightly lower than that of the standard.

Most of the remaining samples showed a higher indicator than the standard. Specifically, the chlorophyll content in the Plot 61 VAR 49 sample was 58.4%, which is 6.3% higher than the standard. Also, Plot 13 VAR 17 samples (57.3%), Plot 1 VAR 15 samples (56.2%), and sample No. 27/2011 (55.9%) were characterized by high chlorophyll accumulation capacity.

The high amount of chlorophyll in the leaves is explained by an increase in the intensity of photosynthesis, a high efficiency of solar energy absorption, and an expansion of the ability to accumulate dry matter. In this regard, samples Plot 61 VAR 49, Plot 13 VAR 17, Plot 1 VAR 15, and

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

No. 27/2011 can be evaluated as physiologically valuable genotypes. It is advisable to use them as a source of high photosynthetic potential in subsequent breeding work.

At the same time, in some samples in the diagram (in particular, Plot 31 VAR 49, Plot 1 VAR 15 and . Tixon samples) have a wide range of values, which indicates that they have a higher variability in response to environmental factors. In contrast, the distribution range of the standard variety Farkhod, Sergey, and Svat samples was relatively narrow, and stable manifestations of the trait were noted in these genotypes.

The diagram below presents an evaluation of 16 samples based on the nitrogen content (mg/g) in the leaves of the triticale plant, with the Farkhod variety adopted as the standard. In the standard Farkhod variety, the average leaf nitrogen content was 19.2 mg/g. The remaining samples were comparatively analyzed against this indicator (Diagram 2).

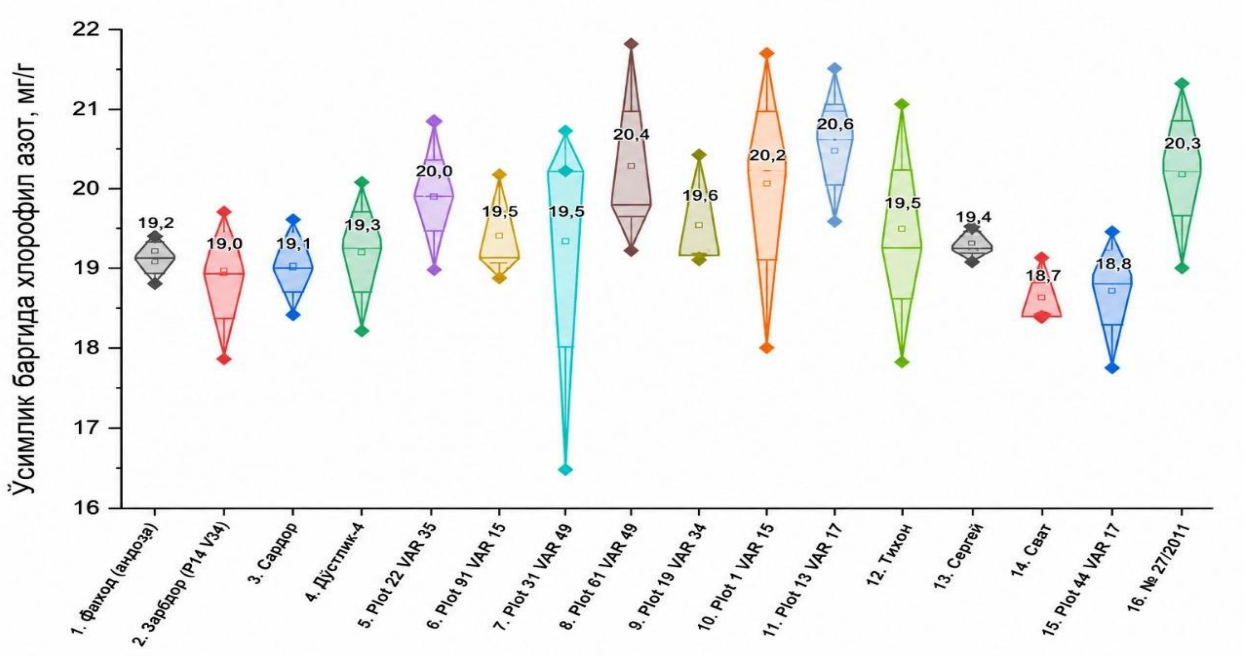


Diagram 2. Nitrogen content in the leaves of a triticale plant

According to the experimental results, the average amount of leaf nitrogen in the standard variety Farkhod was 19.2 mg/g. In rainfed conditions, nitrogen is the main component of chlorophyll synthesis, protein formation, enzyme activity, and photosynthesis in plants. Therefore, a high nitrogen content in the leaves is one of the important indicators in assessing the physiological state and productivity potential of the plant.

Compared to the standard, the leaf nitrogen content in the Zarbdor (R14 V34) and Sardor samples was almost identical, being 0.2 and 0.1 mg/g lower, respectively. Furthermore, the nitrogen content in the Svat and Plot 44 VAR samples was lower than in the standard, decreasing by 0.5 and 0.4 mg/g, respectively. This may indicate that the ability of these samples to absorb nitrogen and accumulate it in vegetative organs is relatively low.

On the contrary, higher results were recorded in most samples compared to the standard. Specifically, the highest average leaf nitrogen value of 20.6 mg/g was recorded in sample Plot 13 VAR 17, which was 1.4 mg/g higher than the standard. Also, Plot 61 VAR 49 sample (20.4 mg/g), sample No. 27/2011 (20.3 mg/g) and sample No. 10 (20.2 mg/g) were characterized by high nitrogen accumulation. This indicates that nitrogen metabolism processes occur actively in these genotypes, protein synthesis occurs at a high level, and the photosynthetic apparatus can function effectively.

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

In the diagram, it was observed that the range of values in some samples is wide. Specifically, the amplitude of distribution in Plot 31 VAR 49, Plot 1 VAR 15, and Tikhon samples indicates a variable response of these genotypes to environmental factors. Conversely, the relatively narrow range in the samples of Farkhod, Sergey, and Svat indicates stable manifestation of the trait.

Conclusion. According to the results of studies on rainfed lands, compared to the standard Farkhod variety, the samples Plot 61 VAR 49, Plot 13 VAR 17, Plot 1 VAR 15, and No. 27/2011 exhibited the highest chlorophyll and nitrogen content; these samples possessed high photosynthetic activity and were characterized by effective nitrogen absorption and accumulation.

These genotypes possess high physiological activity and can be recommended as promising starting materials for the effective use of nitrogen in breeding work. Conversely, the low nitrogen content in the Svat and Plot 44 VAR samples may limit their breeding value for this trait.

References:

1. Бесалиев И.Н., Панфилов А.Л. Продолжителност и условиуа межфазных периодов вегетатsii как факторы продуктивности сортов уаровой пшеницы в Оренбургском Предурале // Животноводство и кормопроизводство. 2023. Т. 106, № 3. С. 202-212.
2. Кабашникова Л. Ф. Хлорофилл – зеленое вещество жизни. Наука и инноватsiи. 2018;(1(179)):65-69.
3. Короткова А.М., Лебедев С.В., Кван О.В., Атландерова К.Н. Оценка влиуаниуа ултрадисперсных частиц на биометрические параметры проростков пшеницы / // Животноводство и кормопроизводство. 2019. Т. 102, № 2. С. 7-20.
4. Коломейченко В. В., Беденко В. П. Теориуа продукционного процесса растений и фитоценоза. Вестник ОрелГАУ. 2008;(4):17-21.
5. Новикова А.А., Емелуанова А.А., Пустовалова А.А., Гречишкина О.С., Мишенина Т.А., Замерзлуак М.В. Оценка экологической пластичности и стабилности сортов уарового уачменуа по урожайности в условиуах Оренбургского региона / // Животноводство и кормопроизводство. 2022. Т. 105. № 4. С. 220-231.
6. Синеговскауа В. Т. Посевы сои в Приамуре как фотосинтезируущие системы. Благовещенск: изд-во «Зеуа», 2005. С. 6-7.
7. Шестакова Е. О., Ерошенко Ф. В., Сторчак И. Г., Огануан Л. Р., Чернова И. В. Влиуание различных элементов технологии возделываниуа на содержание хлорофилла в растениуах озимой пшеницы и ее урожайност. Аграрный вестник Урала. 2020;(5(196)):27-37.