

A COMPARATIVE INVESTIGATION OF THE ELECTROPHORETIC SPECTRA OF THE GLIADINS OF SOME VARIETIES OF WHEAT GROWN IN THE REPUBLIC OF UZBEKISTAN

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The gliadin fractions of six varieties of soft wheat grown in the Republic of Uzbekistan have been investigated by electrophoresis in PAAG. The varieties Sanzar-8 and Enbosh proved to be monogenetic with respect to the index studied, and the others were divided into 4–9 forms in relation to the electrophoretic spectra of their gliadins.

Wheat gliadins exhibit a high level of intervariety polymorphism — practically every variety of wheat has its own unique electrophoretic spectrum, which does not depend on the conditions of growth of the plant [1].

In a comparative study of the gliadins of different varieties a large number of allelic forms of the blocks with respect to the gliadin locus have been found. Catalogs of blocks of the components of the gliadins have been drawn up for soft [2, 3] and hard [4] wheats, and with their aid it is possible to identify more than 20 million genotypes of this crop [3].

We have investigated the electrophoretic compositions of several varieties of soft wheat cultivated in the Republic of Uzbekistan. Among the six varieties studied, two — Sanzar-8 and Enbosh — are electrophoretically homogeneous, while the others proved to be heterogenous for this characteristic and were divided into different electrophoretic forms.

The electrophoretic analysis of the gliadins of 151 ears of the variety Marzhon revealed four electrophoretic forms in a ratio of 118:20:8:5 (Fig. 1, 4–7). All four forms of this variety differed with respect to the electrophoretic components found in the α - and β -zones of the spectrum. In this variety, out of the 96 ears analyzed two electrophoretic forms were found, in a ratio of 3:10 (Fig. 1, 20, 21).

In the case of the variety Unumli bugdoi, six electrophoretic forms were found, in a ratio of 104:28:8:3:2:2 (Fig. 1, 8–13). Most of the ears of this variety had the electrophoretic spectrum shown in Fig. 1, 8. In 28 ears, the spectrum differed from the preceding form by the presence of one minor component in the γ -zone, assigned to the block Gld 1A3, and of three components in the β -zone (Fig. 1, 9). Eight ears had an electrophoretic spectrum characterized by the presence of one main component in the γ -zone, assigned to the block Gld 1B17 (Fig. 1, 10).

In the 96 ears of the variety Sherdor that were analyzed we found seven electrophoretic forms. The first, main, form was present in 68% of the ears (Fig. 1, 15), while the second form, detected in 24% of the ears, differed from the main spectrum by the presence of one component in the γ -zone and two minor components in the α - and β -zones (Fig. 1, 17). In this variety we detected two electrophoretic forms in a ratio of 3:10 (Fig. 1, 20, 21). In single ears we detected two forms of electrophoretic spectra that differed from the main form by the presence of several components in the α - and γ -zones (Fig. 1, 18, 19). These forms contained a main component assigned to block Gld 1A1.

The variety Sanzar-4 proved to be the most heterogeneous among the varieties analyzed. For this we found nine forms of the electrophoretic spectra in a ratio of 80:24:20:16:10:7:2:1:1. An electrophoretic spectrum of the main form is shown in Fig. 1, 22. Two forms shown in Fig. 1 — 23 and 24 — had electrophoretic spectra close to that of the main form but differed by the intensities of staining of two components in the α - and β -zones. The next two forms shown in Fig. 1 — 25 and 26 — had the 1A1 block in their spectra, which differed sharply from the basic spectrum of the main form.

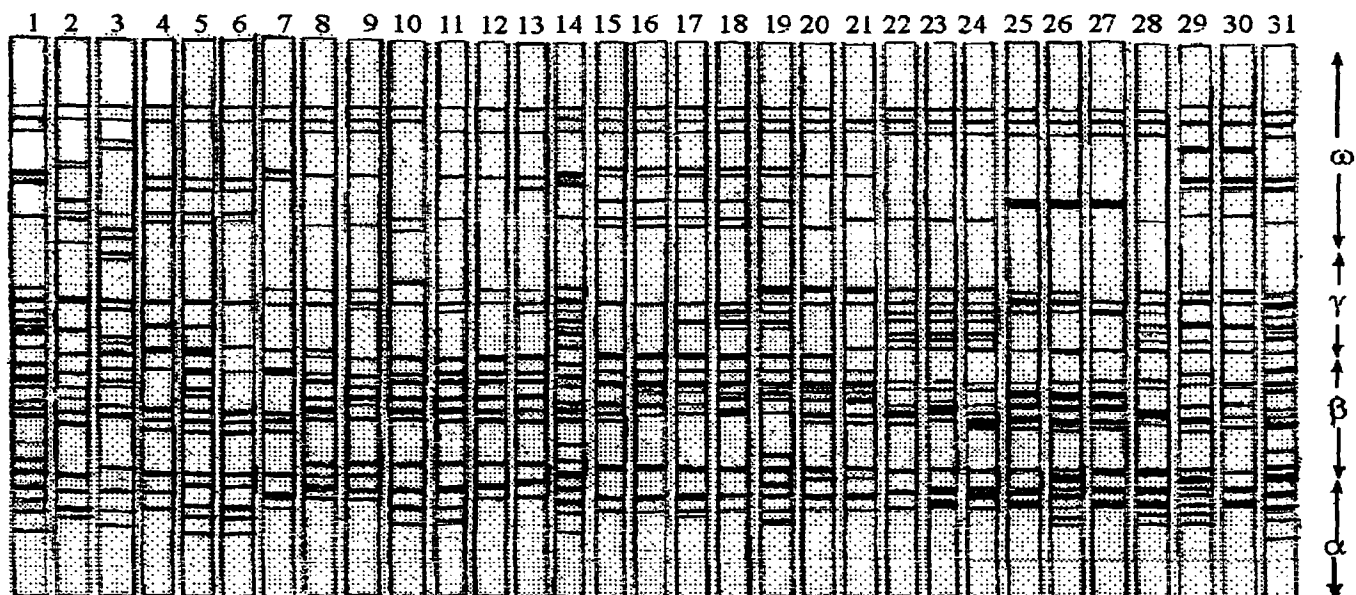


Fig. 1. Polymorphism of the gliadins of some varieties of wheat grown in the Republic of Uzbekistan: 1, 14, 31) the variety Bezostaya-1; 2) Sanzar-8; 3) Ėnbosh; 4—7) Marzhon; 8—13) Unumli bugdoi; 15—21) Sherdor; 22—30) Sanzar-4.

Thus, it has been established that a number of wheat varieties grown in the Republic of Uzbekistan exhibit heterogeneity with respect to the electrophoretic spectra of their gliadins. The separation of these varieties into groups with the aid of this characteristic may reveal populations with the best economically valuable qualities.

EXPERIMENTAL

Varieties of soft wheat regionalized in irrigated zones of the Republic of Uzbekistan and obtained from the Zerno Institute, Gallaorol, were investigated. The wheat was grown in an experimental field of the institute. For analysis we took in each case 100—200 of the most typical and well-filled ears of each variety. The gliadins were extracted with 70% ethyl alcohol from individual grains ground to a fine flour. The electrophoretic analysis of the gliadins was conducted by the method of Bushuk and Zillman [5].

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