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The Role of Georgian Endemic Wheat Species in Biodiversity of Wheat

Tsotne Samadashvili
Doctor of Agricultural Sciences, Professor , Scientific-Research Center of Agriculture, Tbilisi
t. samadashvili@agruni.edu.ge +995 577 314 975

Wheat is the most widespread and important crop in the world. In global food production, wheat culture firmly occupiesin first place and does not give up its position. Wheat is the only crop that fully meets human needs for nutrients necessary for the body. The wide range of essential amino acids in wheat ensures both physical and mental development of a person. Wheat is the most important source of plant proteins for human. Thanks to this significance, scientists of the world have created more than 40 thousand varieties that successfully serve the population of the world.

It must be noted that Georgia has long been recognized as the primary center of origin of wheat in the world (Vavilov - 1940, Zhukovsky - 1971, Dorofeev - 1972, Yakubziner - 1966, Dekaprelevich - 1954, Menabde - 1948, Kihara - 1966, MacKay - 1969). The authors indicate not only the origin, but also imply the evolution of the wheat genus in Georgia. This is evidenced by the ancient traditions of wheat production in Georgia. In the works of ancient Greek historians Herodotus and Xenophon, we come across the information about the distribution of many types of wheat in ancient Georgia. The first monuments of the wheat civilization belong to the Mesolithic period, which is confirmed by archaeological excavations. Several types of wheat have been found in Neolithic settlements - Arukhlo, Khramis Gora, Shulaveris Gora. Among them are hard and soft wheat, whose age dates from 6,000 years BC (Rusishvili et al., 2019). As a result of similar archaeological excavations in a settlement in the village of Digomi, carbonized grains of Zanduri of the late Bronze age were discovered (Maisaia et al., 2005).

Archaeological research has revealed the remains of Tavtukhi grains dating from the 4th and 3rd millennia BC. (Dzidziguri, 2000). According to these materials, the primary wheat species existing in Georgia revealed phylogenesis of the wheat genus and confirmed the diversity of wheat species. Georgian farmers in ancient times gave corresponding names to all this great variety of wheat species. Georgian names for wheat by biological group were "dzveltesli" or autumn, and "akhaltesli" or spring. By species and varieties - Zanduri, Asli, Dika, Tavtukhi, Ipkli, Doli Puri, Khulugo, Khozo, Khotora. By place of origin - Chveneburi, Rachuli, Akhaltsikhe, Kolkhuri, Corbouli. These names give a peculiar folk classification of a wide variety of Georgian wheat varieties. Ecotope is a mesophyte. The

distribution area - Racha, Lechkhumi, Chiatura, Sachkhere, Kvemo Svaneti. Varieties: Khulugo, Khotora, Khozo. Later Korboulis Dolis Puri and Ipkli. According to morphological characteristics - Shavtavtava, Shavtavela, Shavpkha, Tsiteli doli, Shavi dika, Tetri dika. These names are a kind of folk classification of a wide variety of Georgian wheat varieties. According to Ivane Javakhishvili, this is not only the result of observations of farmers, in ancient Georgia there were such writers - agronomists and naturalists as Katon, Varon, Columbella and Plinus. The first information about the biodiversity of Georgian wheat belongs to Sulkhan-Saba Orbeliani (XVII century) and Vakhushti Batonishvili (XVIII century). Foreign naturalists also traveled to Georgia - Guldstadt, Georg and Klaport (18th-19th centuries). In Georgia, even today, it is possible to detect sub-contoured forms resulting from the natural interbreeding of wild and cultural forms. Such forms were discovered in the village Eredvi of Kartli area.

Thanks to the love of wheat culture, in the highlands of Georgia (Racha-Lechkhumi, Meskhet-Javakheti, Mtatusheti) keeled wheat is still grown today and use old Georgian terms: "Jejili" is a newly sprouted field, "Namja" is what is left after harvesting, "Kalo" is a place for threshing ears, "Kevri" is a board for threshing ears, "ulo" means strong binding of wheat stems, "shnakvi" is a tool for collecting wheat.

Genetic and breeding value of endemic species and native varieties of Georgian wheat. Scientists of the world did not lose sight of the uniqueness of the biodiversity of endemic species and native varieties of Georgian wheat.The attention of triticologists of the world is especially attracted by: Chelta Zanduri, Dika Kartlicum and Hexaploid Zanduri (Zhukovsky), characterized by phenomenal complex immunity to fungal diseases; Chelta Zanduri is characterized by high protein content in the grain and high degree of baking ability; the endemic species Kolkhuri Asli is resistant to various types of rust; Macha wheat is characterized by an abundance of leaf mass on the plant and the strength of the stem, well tolerates excess moisture. Soft wheat varieties created by the Georgian people fully met the needs of the Georgian people, and unique varieties are still in demand and are intensively used for food. This demand for older varieties is due to the following positive qualities: 1. Short and strong stem; 2. Disease resistance; 3. Rapid plant development; 4. Fertility recovery; 5. Resistance to grain falling during ripening; 6. Easy thrashing of grain from the spike; 7. Increased content of proteins and essential amino acids in the grain; 8. Coarse graininess; 9. High-quality bakery grinding; 10. Longevity; 11. Broad leaves of the plant; 12. Coarseness; 13. Early ripeness; 14. A gene that determines the ability to preserve baked bread for a long time;

The multi-species biodiversity of Georgian wheat has not gone unnoticed by world scientists. Scientists in Japan, Russia, Germany, England, the United States and France are intensively working on Georgian wheat.

Role of Georgian wheat in soft wheat evolution. The achievement of world breeding in wheat culture is closely related to the creation of soft wheat. Soft wheat fully meets human needs and is one of the most complete food products. The origin of soft wheat is polypholent. This type of wheat originated in many places and many times. To date, four routes of origin of soft wheat have been experimentally established. The first possible way of its creation is associated with the opinion of

Kihara, who received a form similar to soft wheat by crossing the naked form of *T. carthlicum* with wild grain of the diploid form - *Ae. Tauschii* .According to the German triticologist Kukuk, the second way to obtain forms very similar to soft wheat is possible by crossing of Macha and Iranian spelt. This method of resynthesis was tested by L. Decaprelevich and the results have confirmed the experiments of Kukuk. The third route of origin of soft wheat is also associated with the Kukuk data and the same form of Iranian spelt in which the Macha could penetrate by mutation. In Macha species, there are sharply transitional forms with resistance to brittleness of the head stem. Macha's involvement in the origin of soft wheat is substantiated by Georgian triticologists (L. Dekaprelevich,V. Menabde, P. Naskidashvili). The fourth route of origin of soft wheat is due to the crossing of the 42-chromosomal Macha with the octaploid *T. carthlicum*. The latter carries a Q gene that promotes resistance to stem breakage.

According to studies conducted to date, it is recognized in the world that endemic species of Georgia played a large role in the evolution of the genus Triticum. Two species are important in this regard: *T. macha* Dekapr. & Men and *T. persicum* Vav. This process of evolution took place in Georgia.

The role of Georgian wheat in world wheat breeding. It is important to note that 8 new varieties of wheat were obtained on the basis of endemic species of Georgia:

A species of "*T. militinae*" wheat (Zhuk. & Migush 2n = 28) isolated from "*T. Timopheevii*" as a naked grain counterpart. In head coloration it is similar to "*T. persicum* vav." Fuliginnesum.

Wheat species *T. timonovum* (Heslot & Ferari 2n = 28) was obtained in France by autopolyploidy of the wheat variety Timofeev. The species is of the mountain type, easily adaptable to cold climates, pure spring shape.

The wheat species *T. Fungicidum* (Zhuk 2n = 56) was obtained in Russia (1944) by allopolyploidy by crossing *T. Persicum* with *T. Timopheevii*. It carries the genome of G. The species is known as a resistant form to yellow and black rust and powdery mildew.

Wheat species *T. Kiharae* (Dorof &. Migusch 2n = 42), a spelt homolog, obtained by crossing *T. Timopheevii* with *Ae. Tauschii*-. The species is characterized by a high protein content (22-23%). It is resistant to rust and smut.

With the participation of Chelta Zanduri in the USA, Australia, Kenya, Japan, England, many new forms and varieties of wheat were obtained: Melanopus 5, Melanopus 6, Melanopus 7, Steinwedel, Timstein, Mengavi, Lepard, SRPC 67.

Conclusion. The Georgian people as a result of 8,000 years of breeding created a unique variety of wheat species. The immunity of Georgian species to fungal diseases is especially important for the future breeding activity. Wheat variety Chelta zanduri also carries cytoplasmic sterility genes that allow the creation of hybrid wheat. Also in Georgian soft wheat Dolis Puri 35-4, was found a gene that restores fertility. The positive characteristics of Georgian wheat and soft wheat varieties are the best source for creating promising varieties and forms using gene modification and nanotechnology. This is confirmed by data from the Institute of Molecular Genetics in Liverpool. According to German researchers, in the future, humanity will mainly consume wheat variety Zanduri.

Using Georgian wheat species and native varieties of soft wheat, world geneticists and breeders will be able to create new varieties of intensive wheat in the future, using modern methods.

Keywords: wheat, species, biodiversity, usage.

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