

## What wheat varieties to cultivate at our fields?

Flashback in present wheat selection development of Bulgaria.

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*Flashback in the development of the present wheat selection of Bulgaria was executed. Accent over the stages of its development and its varieties creation role for the native grain-producing has been set.*

*The strong tradition in the selection that led to gain rich theoretical experience and practical experience in the selection has been outlined. The advantages of the genetic combinations of signs and properties of the native varieties that make them extremely adaptable and hopeful in the country's conditions have been shown. Some weakness of the Bulgarian varieties were underlined toward the requirements of the yield and the reasons for them from selection point of view, were discussed. The real share of the variety as a factor for yield increasing and its stability was underlined.*

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The wheat selection of Bulgaria has over 100 year's old history. Konstantin Malkov has made the start in 1902 in the Agricultural research station in Sadovo. He has being considered as a pioneer of the native wheat selection. He was the one who determined the adaptability of the different wheat varieties (breadmaking and firmly) for cultivation at the native fields.

Later in 1905 in the Agricultural research station in Obratsov chiflik, town of Ruse and the State Agricultural Station, city of Sofia (1910) a selection has been organized on modern scientific basis. During years the genetic variety of local wheat was collected and examined. Models from Germany, France, Italy, Hungary, USA and Japan had been imported.

**The Method of the intervariety hybridization** that is the most used method in the present has been established during the far 1911 by Prof. Ivan Ivanov in the Agricultural research station in Obratsov chiflik, town of Ruse. The first wheat variety created by him is No. 159 by combining the local **Razgrad red ear awn red wheat** and the "Noe" French variety This variety together with the created in 1925 No 14 and No 301 (1950) were fed the country to the end of 50s of the 20 century.

In the beginning of 60s a new stage started of the wheat selection development in our place. It is concentrated in two selection centres – Institute of Wheat and Helianthus annuus (sunflower), town of General Toshevo and Institute of Plant Resources, town of Sadovo. In 1962 scientific program was approved for wheat selection and that turns into strategic for this culture. Scientific teams were formed consisting of young and active scientists, selectionists, whose main purpose is to create native biotype (ecotype) of wheat to complete the foreign entered in the country after the Second World War.

Only after 10 years hard selection work at the native fields, the cultivation of our varieties has began which overcame with success by yield and grain quality the world masterpiece in wheat, the Bezostaya 1 variety. Our selectionists made varieties which completed with the created in other progressed countries by using this variety after using the collected materials from all over the world together with the local wheat from the native selection. During the period 1962-1992 a lot of investigations were executed all over aspects of the wheat selection and a great practical experience has been collected about what is necessary for production in our countries' conditions. All experts were sent to do specialized training in the most developed selection centres all over the world (USA, Sweden, Italy, Japan, Hungary, USSR). Till then near 60 varieties have been created

which are cultivated at 100% on the territory of the culture in our country. Crisis years followed in the country but not in the wheat selection. The collected diversity output together with the traditional rich practical experience and connections with similar institutions from all over the world, allowed during the last 20 years to be created near 80 varieties in the two selection centres of the country (State Agricultural Institute, G. Toshevo and Institute of plant genetic resources, Sadovo). Delightedly is that in this period private selection companies were established in the country (Agronom, Semenarska kashta Sadovo, Sortovi semena Vardim, Pestitsid, etc.). They made a success creation of 40 new varieties, part of which they have realized in the yield. By this way a native rival sphere has been created in the wheat selection which is in process up to now. In the concrete fight for the Bulgarian market famous European selection and grain companies have included. This year in the official grain list 82 varieties are listed 87% of them are created in our country but 30% in the private sector.

In this great diversity of varieties with different origin, which one has to be cultivated in the country? Is there important difference between the created in our country and the introduction (imported) foreign varieties? May the genetics with European origin be reliable? These are questions that excite the Bulgarian farmers in the choice of variety composition in results of their aspiration for better economical results. The differences are important and in some indications they are contrast, as follows:

1. The wheat is strongly dependant from the microclimate and by this it differs essentially from all others basic field cultures (maize, sunflower, colza, even barley). This is a result from the specific movement conditions and the stage growth which is very special.

2. The yield and the property of the grain are results from the complicated interaction between specific genetic systems which combined each other best in specific cultivation conditions (Bulgaria). The complicated nature of the wheat is a reason every sign and property aroused, to be a result between concrete combination of moisture, temperature and light. This is the reason different results to be obtained from one and the same varieties during the different cultivation years.

3. It is not proved in the yield that the foreign varieties really have higher yield potential at the conditions of the R. Bulgaria in the long run of 5-10 years. Just the contrary many of them are well-expressed during the different seasons when the conditions are possibly closer to those of their creation.

4. Their grain property steps back considerably to the Bulgarian varieties. The evidence is the registered total 11 varieties mostly in the off-grade wheat groups (B, C and D).

5. The tolerance against stress (cold and drought) of the Bulgarian varieties is considerably higher by the reason that these properties are accumulated at the concrete climatic anomaly of the Bulgarian climatic conditions. Both properties are very difficult for selection because their increasing is connected to the yield decreasing. A big part of the foreign varieties are adapted for wetter climate with considerably softer winter characterized with small temperature amplitudes.

6. The tolerance of the native wheat varieties against leaf diseases is at high level enough for the conditions of the country. This does not apart them considerably from the foreign ones which are created as whole in the countries from West Europe (France, Germany, Austria) in which the high tolerance is just compulsory. Even at different diseases in which there are specific for the country races, our tolerance is more stable.

7. The Bulgarian varieties have genetic diversity in all important for the farmers biological and economic qualities (yield, grain property, early movement, layer resistance, etc.). Furthermore they are a result from effective combination between ours and foreign genetic plasma

from all over the world which make them especially yielded and adaptive. In conditions of the becoming more frequent climatic anomalies for the country, a great variation of each indication and property that we dispose as a output selection material, has to be used. The executed number of investigations on different sets of Bulgarian and foreign varieties indicates plainly a considerably bigger genetic diversity in our varieties in comparison with set of Belgium, German, Austrian and other varieties. This certifies the rich inbred nature of the native varieties in the context of their adaptability.

8. The native varieties have proven their high yield potential on series of international studies in 22 countries of Europe and Asia in the first quarter of 21 century. Some of them are approved and zoned in neighbour countries. This is a serious certificate for level and traditions in the culture selection.

9. The created in Bulgaria varieties and output material are used from over 30 years in the most powerful countries and wheat selection leaders as Russia, Ukraine, USA, Hungary, Romania and Serbia. It is a result of the approved through the years forceful selection school in our country which continues to create valuable combination between signs and properties with great negative correlation between them as combination of high yield and early grow, high cold resistance, tolerance against drought and so on. The selection materials consisting of such unique combinations are especially precious for us so as for our colleagues abroad who are expert regarding this.

All of the set forth is not a subjective reasoning but facts that are essential and important for the grain producers and have to be considering during the creation of own variety structure. Some of the farmers who have the opportunity to compare ours and foreign products probably will be opposite to me by opinion different from mine. As a whole the native biotype varieties have the following negative moments for the grain-producing:

1. Lower yield bushiness of the native varieties compared to the foreign varieties. The lowest bushiness of our varieties depends on the conditions in which they have been created. The annual abiotic stress from cold in the winter and drought in the active vegetation, are the reasons to work forward for increasing the grain number in the ear to maximum possible of the culture. This leads to main decreasing in the yield bushiness. In the foreign varieties the highest bushiness is in the result of different from our genes usage for low plant. They provides directly low and healthy (not layer) plant but indirectly improves the levelling as a whole. But these genes provoke considerably higher sensitiveness against drought. In combination with late ear formation and slow spring movement, the foreign varieties are subject to considerably heavy negative effects in the cultivation conditions. The native wheat are little higher but their plant height genes which are investigated in details and used effectively, provides high level of stress tolerance.

2. Significant worst height levelling of the brothers with the main stalk of the separate plant. It is a result from the combination between the specific genes for low stalk (which we consider) in combination with the severe winter conditions, almost every year. The native wheat survives successfully without a problem in 2-3 monthly periods at rest in the winter. In Western Europe at the conditions where the foreign varieties have been created, the winter is significant softer, the vegetation takes its course almost during the whole winter. This stable movement causes "levelling" of the brothers with central stalk. The foreign varieties begin to look like ours, i.e. they are not so levelling when they are cultivated in our country especially after 2 – 3 years. The mainspring is the winter and its low sub-zero temperatures and twenty-four-hour temperature

anomalies for which I wrote in the previous copy of the magazine (Figure 2). The approved wheat area under crops in our country is also a result of the growers' insecurity for the sowings conditions after the winter. Traditionally the higher sowing quotas are also a reason for varieties cultivation with heavy ears in conditions of technologically created thick sowings.

3. Higher plant with lower layer stability, as whole. I have already explained why the stalk of the native varieties usually is higher. The genes for plant height do not shorten it completely but only at the top internode. The so-called "high" pygmy are obtained, with height between 80-90 cm. Comparing with the foreign (70-80) ones, part of our varieties are with 10-15 cm higher.

***In conclusion we can say that the usage of any wheat variety is according the personal choice of the farmer. If the choice is right or not, in the event, this is his problem. A person who treats its variety structure expertly, usually enter into the possibilities for maximum optimization of the part of the variety as a factor. Let's remain that this part of the final yield is 8-12% depending on the conditions of the year. So every person should make its own choice. We, the experts, can only assist this choice to be permanently right.***