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VIKTOR – A NEW TRITICALE VARIETY

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INTRODUCTION

Triticale is a relatively new, anthropogenic grain created by crossing two different species from two different genera. It was created more than 100 years ago in order to unify the positive traits of wheat and rye, which is to bring together high level of protein and energy from wheat with high yield and quality of rye (Radecki, Miller, 1990). It is characterized by a number of positive traits of both parents, and above all, resistance to adverse climatic conditions. The first varieties of triticale were selected and grown in the practical production in the second half of the twentieth century. Modern varieties of triticale have a number of benefits for the successful cultivation: the ability of growing on poor soils, resistance to low temperature and drought, a high potential for grain development and green mass of very good quality. Compared with the two most important crops, corn and wheat, triticale has several advantages and a greater ability to growth on the poor and acidic soils and greater resistance to low temperatures (Zillinski, 1974; Guptai Priyadarshan, 1982; Qualseti Guedes–Pinto; 1966).

Due to a number of benefits in production and due to the increased protein content in grain, triticale plays a more prominent role in the production of crops intended for animal feed in the Republic of Srpska and Bosnia and Herzegovina. The triticale breeding program at the Agricultural Institute of Republic of Srpska, Banja Luka, was initiated at the end of the year 1996 on the territory of Bosnia and Herzegovina, and it is focused on the creation of winter and facultative varieties that will give high and stable yield of good quality, by using an appropriate management system (Mandić, 2007). The triticale breeding program to this day created two varieties of triticale, winter varieties recognized by the Commission for variety recognition * named Oskar – recognized in the year 2006 and Viktor – year 2009.

The aim of this scientific research is to present the comparative advantages of triticale variety Viktor compared to the standard variety Goran.

MATERIAL AND METHODS

Triticale gene collection at the Agricultural Institute of Republic of Srpska consists of about 200 genotypes with which, annually makes about 150 crossing combinations. Hybrid materials were bred by pedigree method. Phenotypically balanced varieties are selected and sown in the preliminary and comparative trials, and after testing is reported to Commission for variety recognition. Variety BL T-10 was created by process of simple hybridization in 1996, from genetically divergent parents, varieties Jugo and Bogo.

The hybrid material was grown by the pedigree method, and phenotypically uniform variety under the code name BL T-10, was selected in 2003, from F-6 generation. In the next two years the agronomic and technological traits were tested in preliminary experiments on the locality – Economy of the Agricultural Institute of Republic of Srpska, Banja Luka. Variety BL T-10 was reported, based on preliminary results, to the Commission for variety recognition in 2006. The variety was tested in three-year trials at two localities by comparing with the standard variety Goran.

The trial studied grain yield, length of vegetation, plant height, lodging resistance and resistance to the causes of plant diseases (*Puccinia recondita tritici, Erysiphe graminis tritici, Puccinia graminis tritici, Septoria spp and Fusarium spp*) and the technological quality of the variety. In this research we have used the results of macro trials conducted by the Agricultural Institute of Republic of Srpska, Banja Luka and the Agency for providing professional services in agriculture.

RESULTS AND DISCUSSIONS

Grain yield. The yield is complex trait and depends on the characteristics of genotype and environmental conditions. One of the decisive factors in achieving high yields is the choice of varieties. According to the results of three-year trials of the Federal Institute of Agriculture, Sarajevo, variety Viktor achieved an average yield of 7.093 kg/ha for all localities, 655 kg more than the standard variety Goran. This difference is highly significant.

Variety Viktor during the three-year trials has achieved the highest yield of 7.120 kg / ha at the locality Butmir, which represents a highly significant difference (724 kg / ha) compared to the standard variety Goran, and the highest absolute yield 7272 kg / ha achieved at the second year of study, locality Živinice, which is a significant difference (859 kg/ha) compared to the standard variety Goran (Table 1). The new variety of triticale Viktor achieved significantly higher yields than the standard variety Goran, regardless of locality and year.

Table.1. The grain yield of triticale variety Viktor (kg / ha) in three-year trials (2007 - 2009) of the Federal Institute of Agriculture, Sarajevo

Tested variety	2007			2008			2009		
	Butmir	Živinice	Average	Butmir	Živinice	Average	Butmir	Živinice	Average
Viktor	7.160^{+}	7.272^{++}	7.216	7.120^{++}	7.020^{++}	7.070	7.080^{++}	6.908^{+}	6.994
Goran	6.320	6.506	6.413	6.400	6.240	6.320	6.468	6.692	6.580
Average	6.740	6.889	6.814	6.760	6.630	6.695	6.744	6.800	6.787
$LSD_{0.05}$	633,45	617,73	-	418,81	460,17	-	354,53	213,46	-
$LSD_{0.01}$	1.048,15	1.022,15	-	692,99	761,43	-	586,636	353,21	-
Cv (%)	5,34	5,09	-	3,52	3,94	-	2,97	1,78	-

In macro experiments of the Agricultural Institute of Republic of Srpska, variety Viktor in three-year trials achieved the highest average yield 6430kg/ha (Chart 1).

The three - year research of 5 triticale varieties of the Agency for providing professional services in agriculture, variety Viktor achieved the highest average grain yield, 5921 kg/ha (Chart 2).

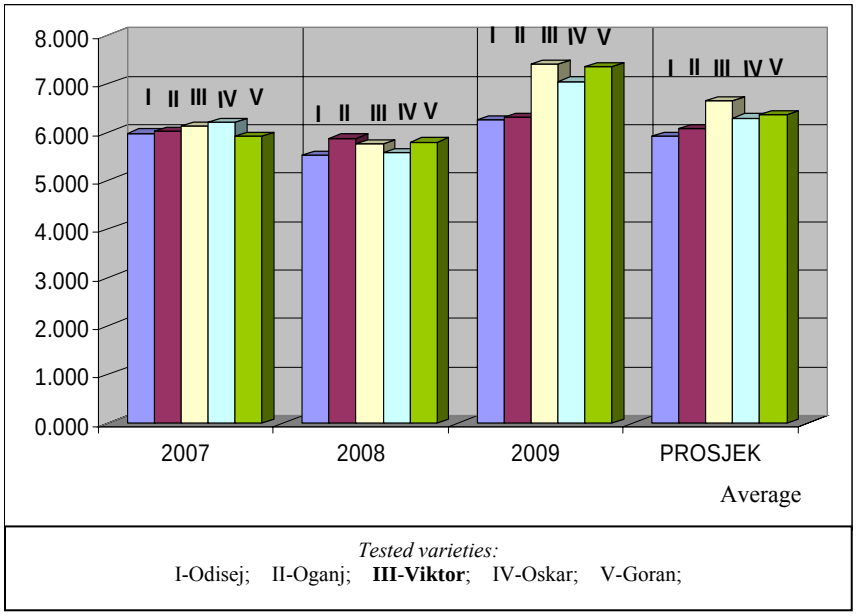

Chart 1. The grain yield of triticale variety Viktor (kg / ha) in three-year trials (2007 - 2009) of Agricultural Institute of Republic of Srpska, Banja Luka

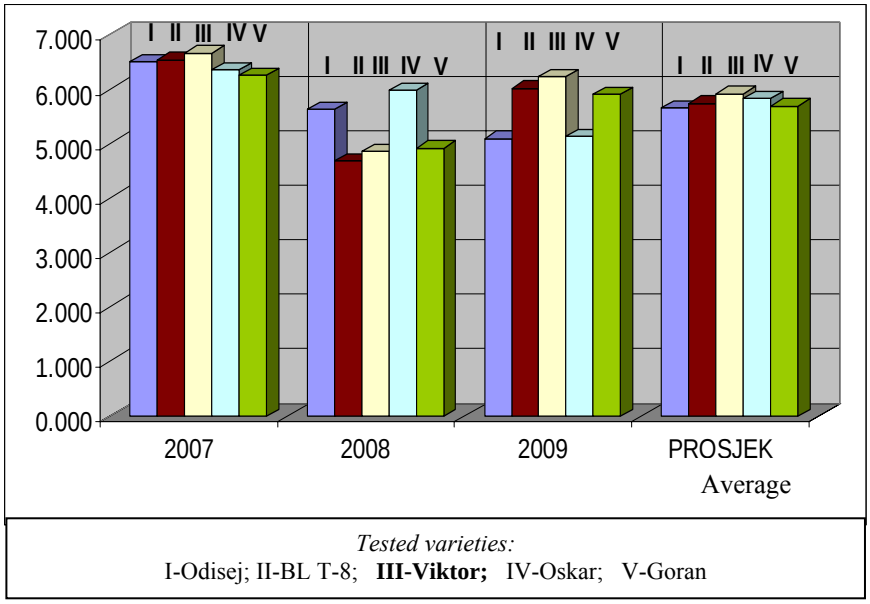

Chart 2. The grain yield of triticale variety Viktor (kg / ha) in three - year trials (2007-2009) of the Federal Institute of Agriculture, Sarajevo

Uniformly high yields, with the exception of the 2008 th, confirm the fact that new triticale variety Viktor achieves high and stable yields in different agro ecological conditions, which confirms adaptability of this variety. This suggests that these varieties can be grown successfully and provide high yields and at lower level management systems which is very important for growing cereals under conditions of climate change (Malešević et al., 2004). Bering in mind the potential of this variety and tendency of increasing the area under the plant species in Bosnia and Herzegovina is expected its rapid expansion in production.

Agronomic traits

Genetic potential is yield that variety achieved under the environmental conditions in which it is adapted. Genetic potential is the direct effect of the expression of genes that determine certain properties or processes (Denčić et al., 1997). In order to have a high genetic potential and stable production potential, new variety should contain the positive agronomic traits such as: resistance to low temperature, lodging resistance, drought tolerance and resistance to plant diseases, etc.Variety Viktor is mature 6 days earlier and higher by 8.3 cm compared to standard variety Goran. It has very good resistance to lodging and plant diseases

Technological quality

Hectoliter weight is an important indicator of the technological quality and depends on grain filled, moisture, fullness, specific weight, chemical composition and the health status of grain. Hectoliter weight was one of the oldest indicators for evaluating the quality of wheat (Mladenov, 1996). Viktor variety has slightly higher hectoliter weight compared to the standard. The value of the weight of 1000 grains indicates that this is variety with medium grain size. Hectoliter weight and weight of 1000 grains were genetic conditioned traits that vary in different ecological conditions influenced by environmental factors. Variety Viktor have higher protein content (11.77%) compared to the standard variety Goran.

Table 2. Agronomic characteristics of triticale variety Viktor (kg / ha) in three - year trials (2007 - 2009) of the Federal Institute of Agriculture, Sarajevo

Traits	**Viktor**	Goran
Length of vegetation to techological maturity	252	258
Plant height (cm)	116.38	108.08
Crop lodging (0-9)*	1.00	1.08
Resistance to Puccinia recondita (%)**	1	1
Resistance to Puccinia graminis (%)**	1	1
Resistance to Erysiphe graminis (%)**	1	1
Resistance to Fusarium sp. (%)**	1	2

* *0 = no lodging; 9 = 100% lodging*
** *% infection by modified Kobo scale*

Table.3. Indicators of Quality of triticale variety Viktor in three-year trials (2007 - 2009) ofthe Federal Institute of Agriculture, Sarajevo

Traits	**Viktor**	Goran
Hectolitre weight (kg)	75.19	75.13
Weight of 1.000 grains (g)	41.49	42.05
Protein content (%)	11.77	11.40

CONCLUSIONS

New variety Viktor achieved significantly higher yields than the standard variety Goran, the difference amounted to 655 kg/ha. It have a very good resistance to plant diseases and good technological traits. Variety Viktor is mature 6 days earlier compared to the standard. The average raw protein content in the three - year study at two locations was 11.7%

With recognition of new triticale variety Viktor, assortment of triticale varieties in Bosnia and Herzegovina is richer for one more high-yield, medium-early variety, very good resistance to plant diseases, with wide adaptability, a satisfactory yield stability, and good level of tolerance to drought.

ABSTRACT

Highly viable, medium-early variety of facultative triticale named Viktor was created by crossing the genetically divergent parents, varieties Jugo and Bogo. This variety created by the Agricultural Institute of the Republic of Srpska, Banja Luka, has successfully combined the genes responsible for high grain yield potential, good processing quality (raw materials for industry and animal feed), excellent resistance to low temperatures, very good resistance to lodging and plant diseases.

Variety Viktor in three-year trials of the Federal Institute of Agriculture, Sarajevo, achieved significantly higher yields than the standard variety Goran, the difference amounted to 655 kg / ha. Variety Viktor is mature 6 days earlier compared to the standard. The average raw protein content in the three-year study at two localities was 11.7%. The new variety of winter BL triticale has a wide adaptability, a satisfactory yield stability, and a good level of tolerance to drought.

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