

INVESTIGATION OF GENETIC POTENTIAL OF GRAIN YIELD OF WHEAT VARIETIES CULTIVATED IN THE BITOLA PART OF PELAGONIJA

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ABSTRACT

Genetic potential of grain yield of six wheat varieties: pobeda, emese, super zitarka, barbara, pesna and altana was investigated and the possibilities for their cultivation in the Bitola part of Pelagonija, in the production year 2010 and 2011.

Out of the six investigated wheat varieties, the highest average yield of the two production years achieved varieties altana (5243 kg/ha) and emese (5108 kg/ha). Lowest yield was registered for super zitarka (3400 kg/ha) and pesna (3580 kg/ha). In general, considering that the varieties were cultivated without irrigation, it could be considered that all have expressed high grain yield. However based on the obtained results the varieties altana and emese could be recommended for wheat production in this region. .

All of the six examined wheat varieties, cultivated in conditions with no irrigation, in Bitola part on Pelagonija, achieved high grain yield and can be successfully grown in this region.

Key words: wheat, genetic potential, variety, grain yield.

1. Introduction

For achieving high and stable wheat grain yield, despite the application of standard agrotechnical measures, one of the most important preconditions is the selection of most appropriate genotype or variety that will respond to the climatic and soil conditions in the region in order to express its genetic potential for grain yield.

Our examinations were focused in determination of the genetic potential of grain yield of six soft wheat varieties. The yield is a complex quantitative properties and is the result of multiple properties as the number of grains per class and more. This property though it largely depends on the growing conditions and the influence of environmental factors. Therefore it is recommended that he be evaluated over several years to see the true potential of the variety and its stability to this property.

2. Material and method for work

Tests were carried out in the production 2009/2010 and 2010/2011 in the localities of the village Novaci on the surfaces of individual producers. The experiment included six wheat varieties originating from different countries:

- pobeda, made in the Institute for field crops and horticulture Novi Sad, Serbia.[3];
- emese, Agricultural Research Institute of the Hungarian Academy of Sciences, Hungary. [5];
- super zitarka and Barbara, Agricultural Institute - Osijek, Croatia. [4];
- pesna, Institute for Crop Production, Sadovo, Bulgaria;
- altana, Agricultural Institute - Skopje, Macedonia

Variety pobeda was used as a standard for comparison with other varieties

Tested varieties belong to the group of soft winter wheat. Experiments were set up and analyzed by the method of Fischer-randomized blocks or random block system in four iterations, the size of experimental plots of 500 m². The results are compared with the standard, and deviations from the standard are given in % and kg / ha.

After harvesting is performed, determination of moisture in the grain, and the yield in kg/ha with 14% humidity.

In the two years of testing, previous crop was corn silage. It is used a standard agrotechnic for wheat, with technical measures have been implemented in the following order: plating of plant remains 15.09.2009 and 16.09.2010 year, reverberating of plant remainings (15-20 cm) 17.09.2009 and 19.09.2010 year, fertilization (100 kg/ha N, 90 kg/ha P and 60 kg/ha K) 22.09.2009 and 23.09.2010 year, deep plowing (30-40 cm), 24.09.2009 and 25.09.2010 year, plating, cultivation and sowing, 10.10.2009 and 12.10.2010, fodder (80 kg/ha N) 27.02.2009 and 29.02.2010 year, protection from weeds after sowing (tight plate Tolureks 2,8 l/ha + wide plate with Logran 45 g/ha), 05.04.2009 and 09.04.2010 year and foliar in spring until the second nodule (in phase to second kolenc with Axiall 0,8 l/ha) 10.04.2009 and 12.04.2010. Harvest was conducted on 18.07.2010 and 20.07.2011.

2.1. Soil and climatic conditions

a). Soil conditions

According to Filipovski (1971), soil conditions in Bitola part of Pelagonija are heterogeneous, i.e. represented are various soil types and subtypes. In the locality where tests are performed in the village Novaci, soil type is alluvial, without carbonate and with weak acidic reaction (pH in KCl 6,05 and H₂O 6,50), which is a suitable environment for the development of wheat. Nutritious substances were analyzed according to the AL method (Bogdanovic, 1966 - quote by Filipovski), the soil is well supplied with humus (2,58) and provided with secondary nutrients (P₂O) 13,5 and (K₂O) 19,40 by the method of Tjuran and Konanova. [1]

b). Climatic conditions

In Table 1 the data is given on the temperature conditions in Bitola part of Pelagonija, of which can be seen that they give opportunity to successfully grow the wheat varieties with different length of vegetation period.

Tab.1 Climatic conditions

Months	Year		Year	
	Rainfalls in mm 2009/2010	Average monthly air temperature °C 2009/2010	Rainfalls in mm 2010/2011	Average monthly air temperature °C 2010/2011
IX	53, 1	17, 9	46, 3	16, 1
X	134, 0	11, 7	142, 0	7, 7
XI	70, 2	7, 6	65, 3	10, 6
XII	101, 1	6, 6	79, 2	3, 6
I	52, 4	2, 8	51, 2	0, 5
II	118, 2	4, 2	29, 7	5, 4
III	77, 3	7, 4	11, 7	6, 8
IV	55, 2	12, 0	14, 8	10, 9
V	82, 4	16, 9	82, 7	14, 6
VI	43, 2	20, 9	31, 9	19, 9
Total	787, 1		554, 8	

According to Jevtic (1986), in wheat regions in the R. Serbia where precipitation amounted to 600 l/m², during the vegetation, if the coefficient of exploitation is 70% which means 420 l/m², each year there are economies whose surfaces are receiving yield per 7000 kg/ha. [2]

In the table 1 the provided data on the total amount of rainfall during the vegetation of wheat which meet the needs for normal development and achievement of high yields of this crop. In the first year of examination the rainfalls are amounted to 787.1 mm, while in the second year is lower to 554.8 mm, which means less for 232.3 mm. If we analyze precipitation in both years, of testing by month during the vegetation we will notice that the biggest differences there are in February

(20010 - 118.2mm and 2011 - 29.7mm), March (2010 - 77.3mm and 2011 - 11.7mm) and April in (2010 - 55.2mm and 2011 - 14.8mm).

In terms of the availability of soil moisture, should be taken the fact that surfaces which were used for the tests are adjacent river Crna. Therefore under soil water in this part are maintained constantly at a high level, which of course affects the recharge of the water shortages.

3.Results and discussion

Tab. 2 Grain yield of the tested wheat varieties

Num.	Genotype	2009/10-2010/11	2009/10	2010/11	2009/10 - 2010/11	Index %
		Average Number of plants m ²	Average yield (kg/ha)	Average yield (kg/ha)	Average yield (kg/ha)	
1	pobeda St.	600	4742	4582	4662	100,00
2	emese	610	5166**	5050**	5108**	109,57
3	altana	600	5336**	5150**	5243**	12,46
4	pesna	620	3660	3500	3580	76,79
5	super zitarka	590	3500	3300	3400	72,93
6	barbara	595	4350	4150	4250	91,16

LSD_{0,05} = 295 kg; LSD_{0,01} = 465 kg

In Table 2 are given data for the trait yield of grain of six genotypes of wheat varieties.

Variety pobeda (St) which was used for a standard achieved average yield of grain of 4662kg/ha.

Compared with the standard higher yield reached varieties altana (5243 kg/ha) 12.46% and emeshe (5108 kg/ha) 9.57%, remaining varieties had lower yield than pobeda, variety barbara with 4250 kg/ha pesna with 3580 kg/ha and super zitarka with 3400 kg/ha, powered by 91.16%, 76.79% and 72.93% (sequence) of the yield of the standard.

Chart 1, concisely presents the data from Table 2, the average yield of grain tested wheat varieties.

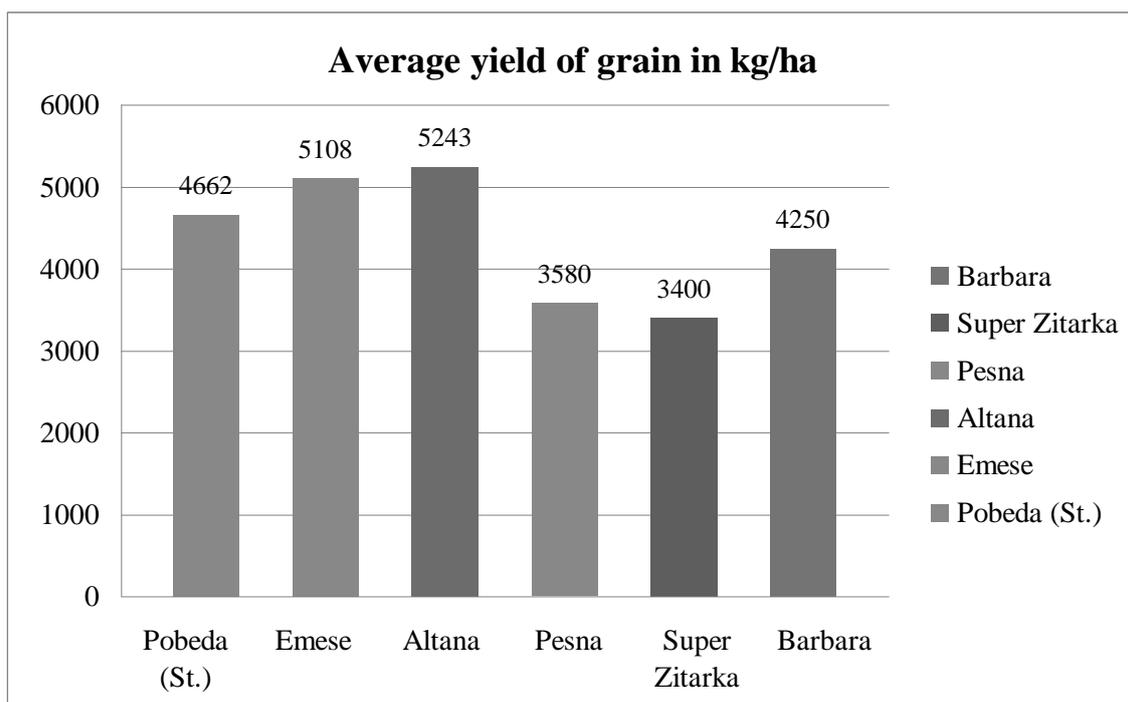


Chart 1. Average yield of grain tested wheat varieties

From the obtained results it can be concluded that all tested varieties have high yield, especially if we consider that they are grown without irrigation and with success can be grown in Bitola part of Pelagonija. Compared with the standard, higher yield reached varieties altana (5243 kg/ha) 12.46% and emeshe (5108 kg/ha) of 9.57%.

4. Conclusion

Based on two years of studies of the genetic yield potential of grain (2009/2010 and 2010/2011), in Bitola part of Pelagonija, the wheat varieties which belong to the group of winter varieties, the following conclusions can be drawn:

Of the six tested varieties of wheat, the highest yield was achieved in variety altana with average yield of 5243 kg/ha, followed by variety emeshe with average yield of 5108 kg/ha, the variety pobeda which was taken to St, with average yield of 4662 kg/ha variety barbara with average yield of 4250 kg/ha, the variety pesna, with an average yield of 3580 kg/ha and the lowest among the variety super zitarka with average yield of 3400 kg/ha.

Tested wheat varieties, grown without irrigation, in Bitola part of Pelagonija reached high yield grain and with success can be grown in Bitola part of Pelagonija and elsewhere in the Republic of Macedonia.

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