

EXAMINATION ON GENETIC POTENTIAL OF TRAIT YIELD OF GRAIN ON BARLEY VARIETIES CULTIVATED IN THE BITOLA PART OF PELAGONIJA

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ABSTRACT

It is examined genetic potential of trait yield of grain on three genotypes of barley varieties: Reks (St), Barun and Zlatko, made in Agricultural Institute in Osijek, R. Croatia, and possibilities for breeding in the Bitola part of Pelagonija, in production year 2010 and 2011.

From the three examined genotypes of barley varieties, the genetic potential of the property yield of grain, mostly come to expression at variety Reks (St), with an average yield of grain of 6771, 5 kg/ha, which compared with Barun variety gave higher yield of 11.27% or 763 kg/ha, while in comparison with Zlatko variety gave higher yield of 19.2% or 1300 kg/ha.

Out of the three examined genotypes of barley varieties, cultivated in conditions without irrigation, in Bitola part on Pelagonija, is achieved high yield of grain and it can be breed with success in Bitola part on Pelagonija.

Key words: barley, genotype, genetic potential, variety, yield.

1. Introduction

For achieving high and stable grain yield at barley, despite the application of standard agrotechnic for the Pelagonian region, one of the most important preconditions is the selection of appropriate genotype – barley variety that most of all will respond to agotechnical conditions offered by the region in order to come to expression the genetic potential of trait yield of grain of the variety.

Our examinations were focused to determine the genetic potential of trait yield of grain on three genotypes of barley varieties, which belong to the group of early mature, double row barley varieties intended for the needs of livestock and the malt industry.

2. Material and method for work

Examinations were conducted in the production 2009/2010 and 2010/2011 year, in the locality in village Radobor, on the surfaces of AD-ZK Pelagonija. Planting material is obtained from the Agricultural Institute in Osijek, R. Croatia. They are early mature, winter and double row genotypes of barley varieties. Examinations are set by the method of random block system in 5 repetitions, with size of the studied parcels of 1000 m². The results are compared with the standard, and the standard deviations are given in % and kg/ha. Based on measurements, carried out after the harvest, of each repetition, of the studied genotypes of barley varieties was conducted visual assessment of the trait yield of grain. After harvesting, is performed determination of moisture in the grain, and the yield in kg/ha with 14% moisture. During the vegetation are conducted standard agricultural practices such as: on locality in village Radobor - soil type aluvium, preculture sunflower in both years of testing, plating of plant remains 19.10.2009/10 and 20.10.2010/11 year, reverberating of plant remainings (15-20cm) in 20.10.2009/10 and 21.10.2010/11 year, fertilization (100kg/ha N, 90kg/ha P и 60kg/ha K) in 22.10.2009/10 and 23.10.2010/11 year, deep plowing (30-40 cm), 24.10.2009/10 and 25.10.2010/11 year, plating, cultivation and sowing, 26.10.2009/10 and 27.10.2010/11 year, feed (80kg/ha N) 25.02.2009/10 and 2010/11 year, protection from weeds after sowing for (tight plate Tolureks 3l/ha + wide plate with Logran 40 g/ha), 28.10.2009/10 and 29.10.2010/11 and foliar in spring until the second nodule (wild oat with axially 0.5 l/ha) 10.04.2009/10 and 12.04.2010/11, and harvest on 08.07.2009/10 and 09.07.2010/11 year.

2.1. Soil and climatic conditions

a). Soil conditions

According to Mr. Filipovski (1971), soil conditions in Bitola part of Pelagonija are heterogeneous, ie represented are various soil types and subtypes. In the locality where tests are performed in the village Radobor, soil type is alluvial, without carbonate and with weak acidic reaction (pH in KCl 6, 15 and H₂O 6, 70), which is a suitable environment for the development of barley. Nutritious substances were analyzed according to the AL method (Bogdanovic, 1966), the soil is well supplied with humus (2.55) and provided with secondary nutrients (P₂O) 13, 8 and (K₂O) 19, 70 by the method of Tjuran and Konanova.

b). Climatic conditions

In Table 1 are given data on the temperature conditions in Bitola part of Pelagonia, of which can be seen that they give opportunity to successfully grow the barley 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 S. 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.

In the table are provided data on the total amount of rainfall during the vegetation of barley which meet the needs for normal development and achievement of high yields of this crop. In the first 2009/10 year of examination amounted to 787.1 mm, while in the second 2010/11 year amount to 554.8 mm, which means less for 232.3 mm. If we analyze precipitation in both years, 2009/10 and 2010/11, of testing by month during the vegetation we will notice that the biggest differences there are in February (2009/10 to 118.2mm and 2010/11 to 29.7mm less for 88.5 mm), March (2009/10 to 77.3mm and 2010/11 to 11.7mm, less for 65.6mm) and April in (2009/10 to 55.2mm and 2010/11 - 14.8mm, less for 40.4mm).

After that if we take into consideration the fact that the surfaces on which tests are performed are located near to the river Sevnica, which has an impact in meeting the lack of water, because underground water in this part are maintained consistently at a high level.

3.Results and discussion

According to Jevtic S. (1986), in wheat regions for normal development and achievement of high yields is required 420 l/m², water to meet the needs of cereals. Barley from cereals matures early and avoids any high temperatures during the summer. From the data in Table 1, it can be concluded that the total amount of water meets the needs of barley for the better usage of the genetic potential of the tested trait yield of grain, among the tested genotypes of barley. The difference from the need of water during the vegetation of barley, i.e. in the months that appear in

deficit, is complemented after capillary path from the river Sevnica, because the surface on which tests are conducted, are in its immediate vicinity.

Tab. 2 - Examination of the genetic potential of the trait yield of grain on genotypes of barley varieties in the locality of the village Radobor.

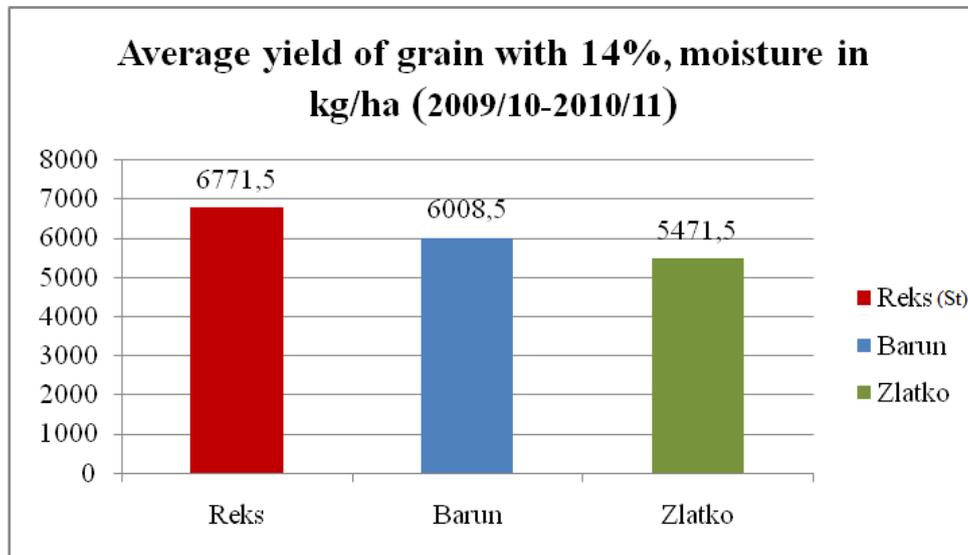
| Num. | Genotype | 2009/10 | 2010/11 | 2009/10-2010/11 | 2009/10 | 2010/11 | 2009/10-2010/11 | Index % |
|------|----------|---------------------------------|---------------------------------|---|---|---|---|---------|
| | | Number of plants m ² | Number of plants m ² | Average number of plants m ² | Average yield of grain with 14% moisture in kg/ha | Average yield of grain with 14% moisture in kg/ha | Average yield of grain with 14% moisture in kg/ha | |
| 1 | Рекс St. | 620 | 610 | 615 | 6550 | 6993 | 6771,5 | 100,00 |
| 2 | Барун | 610 | 614 | 612 | 5800 | 6217 | 6008,5 | 88,73 |
| 3 | Златко | 615 | 609 | 612 | 5360 | 5583 | 5471,5 | 80,80 |

In Table 2 are given data for the examination of genetic potential of the trait yield of grain of three genotypes of barley varieties created in the Agricultural Institute in Osijek, R. Croatia such as: Rex (St), Barun and Zlatko and opportunities for breeding in Bitola part of Pelagonija in the production year 2009/2010 and 2010/2011.

From the three examined genotypes of barley varieties, the genetic potential of the trait yield of grain, mostly come to expression at variety Reks (St), with an average yield of grain of 6771, 5 kg/ha, which compared with Barun variety (6008, 5 kg/ha) gave higher yield of 11.27% or 763 kg/ha, while in comparison with Zlatko variety (5471, 5 kg/ha) gave higher yield of 19.2% or 1300 kg/ha.

In Chart 1, are represented the data from Table 2, for the genetic potential of trait yield of grain of the examined genotypes of barley varieties.

Chart 1



From the chart it is obvious that out of the three examined genotypes of barley varieties, the highest yield was achieved at variety Reks, which was taken for (St) with an average yield of 6771.5 kg/ha, then at Barun variety with an average yield of 6008.5 kg/ha and lowest at variety Zlatko with an average yield of 5471.5kg/ha.

Out of the three examined genotypes of barley varieties, cultivated in conditions without irrigation, in Bitola part on Pelagonija, is achieved high yield of grain and it can be breed with success in Bitola part on Pelagonija.

4. Conclusion

Based on two year examinations (2009/2010 and 2010/2011) in Bitola part of Pelagonija the genetic potential of the trait yield of grain on the genotypes of barley varieties, which belong to the

group of early mature, double row and winter varieties (Reks (St), Barun and Zlatko), created in the Agricultural Institute in Osijek, R. Croatia can be drawn the following conclusions:

1. From the three examined genotypes of barley varieties, the genetic potential of the property yield of grain, mostly come to expression at variety Reks (St), with an average yield of grain of 6771, 5 kg/ha, which compared with Barun variety (6008, 5 kg/ha) gave higher yield of 11.27% or 763 kg/ha, while in comparison with Zlatko variety (5471, 5 kg/ha) gave higher yield of 19.2% or 1300 kg/ha.

2. Out of the three examined genotypes of barley varieties, cultivated in conditions without irrigation, in Bitola part on Pelagonija, is achieved high yield of grain and it can be breed with success in Bitola part on Pelagonija.

3. All three examined genotypes of barley varieties, are intended for the needs of livestock and beer industry.

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