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PRODUCTIVITY OF SOME WINTER WHEAT GENOTYPES

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Yields given by different genotypes are affected by many factors, but mostly by genotype, climatic conditions and applied growing practice. Therefore, the aim of this study was to establish productivity of many winter wheat genotypes in southern Serbia, through macro-trials. The results showed the difference of grain yield mean between the investigated seasons, and that difference amounted about 1300 kg/ha. The average yield was the highest in cultivars Toplica, Stamena, Evropa, NS-rana 5, and Renesansa. The lowest grain yield was given by cultivars Tina, Sara, Sreca, and Mina.

Key words: winter wheat, productivity, genotype

INTRODUCTION

Wheat is the most important plant species, and wheat grain is the basic element of food. Having in mind this fact and the constant growth of human population, there is a need for sufficient supplies of wheat grain. So it has been observed a tendency of increased wheat production in last 40 years (DENČIĆ and KOBILJSKI, 2004). Yields given by different genotypes are affected by many factors, but mostly by genotype, climatic conditions and applied growing practice.

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Grain yield increase is affected by new genotypes with a great genetic potential, and by growing practices enabling fulfillment of that potential. Agronomic value of a cultivar depends of its ability to realize the genetic potential in different production conditions (MLADENOV, 1996). This study was aimed to find out productivity of many wheat genotypes, in southern part of Serbia, through macrotrials.

MATERIAL AND METHODS

Macrotrials were carried out in 1999-2001 in Leskovac, with twenty wheat cultivars, where sunflower and maize were grown before wheat. During the trial the standard growing practices were applied. Fertilizer rates were the following: 110-140 kg/ha N, and 45 kg/ha P_2O_5 and K_2O respectively. Grain yield is expressed in kg/ha with 14% of moisture.

Climatic conditions. - Climatic conditions of wheat vegetation period are given in table 1. One can see in the table that in 1999/00 the total vegetation rainfall was 459 mm, and in 2000/01 511 mm. However, precipitation schedule in 2001 was irregular, and the most of precipitation fell during grain forming and filling.

Tab. 1. Temperature and precipitation during wheat vegetation

	Average monthly temperature (^{0}C)		Total monthly precipitation (mm)	
	1999/2000	2000/01	1999/2000	2000/01
Month				
October	11.2	12.3	47	19
November	5.7	9.7	68	16
December	2.8	3.8	90	26
January	-3.2	3.3	35	26
February	3.3	2.9	38	61
March	6.5	10.6	27	47
April	10.1	10.4	28	159
May	16.7	16.5	41	41
June	18.9	18.4	47	72
July	22.4	21.5	38	44
Total vegetation rainfall			459	511

RESULTS AND DISCUSSION

Table 2 gives the data of wheat productivity in 2000. Moisture content in harvest was under 14% in the all genotypes, and hectoliter mass ranged from 73.85-80.30 kg. The average grain yield was 3620 kg/ha. The greatest yield was given by the cultivars Jarebica (4.500 kg/ha), Stamena (4.415 kg/ha) and Tiha (4.165 kg/ha), and the lowest one by Silna (2.666 kg/ha), Pesma (2.915 kg/ha) and Sara (3.083 kg/ha).

Tab. 2. Wheat genotypes productivity at macrotrial in 2000

No	Cultivar	Moisture (%)	Hect. mass (kg)	Yield (kg/ha)	Rank
1.	Evropa	12.8	76.65	3250	14
2.	Sreća	12.8	76.65	3833	9
3.	Tiha	12.1	77.45	4165	3
4	Sara	11.5	73.85	3083	18
5.	Mina	10.6	73.85	3250	15
6.	Pobeda	10.0	75.85	3915	6
7.	Renesansa	10.8	77.05	3500	11
8.	Toplica	10.2	76.25	4000	5
9.	Stamena	10.8	78.70	4415	2
10.	Takovčanka	10.2	76.65	3500	13
11.	Bajka	9.2	77.05	4080	4
12.	Studenica	10.8	78.25	3500	12
13.	NS-rana-5	11.2	77.05	3666	10
14.	Gracija	11.4	78.70	3165	17
15.	Jarebica	13.0	76.65	4500	1
16.	Rusija	11.6	76.65	3915	7
17.	Pesma	11.2	77.45	2915	19
18.	Zlatka	10.2	80.30	3166	16
19.	Lazarica	11.2	77.05	3915	8
20.	Silna	11.8	76.65	2666	20
		Mean		3620	

Tab. 3. Wheat genotypes productivity at macrotrial in 2001

No	Cultivar	Moisture (%)	Hect. mass (kg)	Yield (kg/ha)	Rank
1.	Evropa	12.7	67.65	2760	4
2.	Sreća	12.8	66.85	2190	13
3.	Tiha	13.7	67.65	1880	16
4.	Sara	13.5	66.00	2200	10
5.	Mina	14.5	66.40	2400	6
6.	Pobeda	14.00	69.25	1840	17
7.	Renesansa	14.5	60.80	2300	8
8.	Toplica	12.2	72.85	2100	14
9.	Stamena	13.3	67.25	1650	20
10.	Takovčanka	12.6	70.05	2300	7
11.	Bajka	13.8	65.20	1700	19
12.	Studenica	12.3	74.45	2230	9
13.	NS-rana-5	13.7	61.20	2200	11
14.	Gracija	13.2	63.20	2100	15
15.	Sonata	14.0	67.65	3800	1
16.	Ljiljana	13.5	64.80	1800	18
17.	Anastasija	14.2	66.00	2190	12
18.	Zitka	13.5	61.60	2690	5
19.	Marta	12.6	70.45	3260	2
20.	KG-100	12.5	69.65	2840	3
		Mean		2322	

In 2001 moisture content was a little higher and ranged between 12.2% and 14.5%. Hectoliter mass was from 60.8-74.45 kg, and was lower than in the previous year. The average grain yield of the all genotypes was 2.322 kg/ha.

Tab. 4. The average wheat grain yield in macrotrial

Cultivar	Moisture (%)		Hect. mass (kg)		Yield (kg/ha)		Mean yield	
	2000	2001	2000	2001	2000	2001	(2000-2001)	Rank
Evropa	12.8	12.7	76.65	67.65	3250	2760	3005	3
Sreća	12.8	12.8	76.65	66.85	3833	2190	2720	12
Tiha	12.1	13.7	77.45	67.65	4165	1880	2565	14
Sara	11.5	13.5	73.85	66.00	3083	2200	2642	13
Mina	10.6	14.5	73.85	66.40	3250	2400	2825	11
Pobeda	10.0	14.0	75.85	69.25	3915	1840	2878	8
Renesansa	10.8	14.5	77.05	60.80	3500	2300	2900	5
Toplica	10.2	12.2	76.25	72.85	4000	2100	3050	1
Stamena	10.8	13.3	78.70	67.25	4415	1650	3033	2
Takovčanka	10.2	12.6	76.65	70.05	3500	2300	2900	6
Bajka	9.2	13.8	78.25	74.45	3500	2230	2865	7
Studenica	10.8	12.3	78.25	74.45	3500	2230	2865	9
NS-rana 5	11.2	13.7	77.05	61.20	3666	2200	2933	4
Gracija	11.4	13.2	78.70	63.20	3165	2100	2845	10

The average grain yield in 2001 was lower by 1298 kg/ha than in 2000. Despite the fact that there was by 511 mm more rainfall in 2001 during vegetation period, its schedule was unfavorable, so during grain filling there was a lot of precipitation, which caused a bad grain fulfillment. In 2001 raised grain moisture content, and hectoliter mass was lower than in 2000, which gave a lower grain yield as a consequence. Wheat grain yield dependence of weather conditions during grain forming and filling was also reported previously (PAULSEN, 1983; LIMBERG, 1972; MALEŠEVIĆ, 1989).

Table 4 gives the data concerning the average two-year grain yield of the genotypes sown in both years. One can see that the best grain yield was given by cultivars Toplica (3.050 kg/ha), Stamena (3.033 kg/ha) and Evropa (3.005 kg/ha), and the lowest one by Tiha (2.565 kg/ha), Sara (2.642 kg/ha) and Sreća (2.720 kg/ha). These values are quite low regarding genetic potential of the cultivars. That was caused by an unfavorable weather conditions and insufficient application of growing practices.

For the southern part of Serbia we can recommend cultivars Toplica, Stamena, Evropa, NS-rana 5 and Renesansa, as the best-yielding ones.

CONCLUSION

On the basis of the two-year macrotrial results we can conclude the following:

Wheat grain yield differed by year, and that difference was about 1300 kg/ha.

The greatest grain yield was given by the cultivars Toplica, Stamena, Evropa, NS-rana-5 and Renesansa.

The lowest grain yield was given by cultivars Tiha, Sara, Sreća and Mina.

The best yielding cultivars can be recommended for growing in the studied area.

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PRODUKTIVNOST NEKIH GENOTIPOVA PŠENICE

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Izvod

Prinosi koje sorte pšenice postižu su različiti i zavise od više faktora, a najviše od genotipa, agroklimatskih uslova i primenjene tehnologije proizvodnje. Stoga je cilj ovoga rada bio da se utvrdi produktivnost više genotipova pšenice u južnom delu Srbije, putem makroogleda. Tako je u 2000. i 2001. godini u makro-oglede bilo uključeno 20 genotipova pšenice. Rezultati istraživanja pokazuju da su se prinosi znatno razlikovali po godinama i ta razlika je u proseku iznosila oko 1300 kg/ha. Prosečni dvogodišnji rezultati pokazuju da su najveše prinose ostvarile sorte Toplica, Stamena, Evropa NS-rana-5 i Renesansa. Najniže prinose imale su sorte Tiha, Sara, Sreća i Mina.

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