

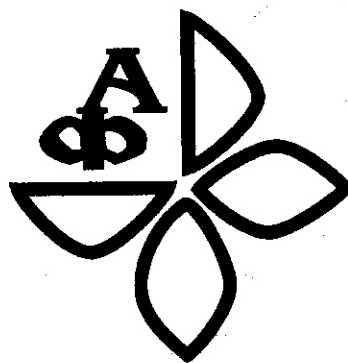
UNIVERZITET U KRAGUJEVCU  
AGRONOMSKI FAKULTET U ČAČKU



UNIVERSITY OF KRAGUJEVAC  
FACULTY OF AGRONOMY ČAČAK

# **XV SAVETOVANJE O BIOTEHNOLOGIJI**

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## PRODUCTION CHARACTERISTICS OF MACEDONIAN GENOTYPES SOFT WINTER WHEAT

M. Ilievski, Dragica Spasova, D. Spasov, Biljana Atanasova, M. Georgievski<sup>1</sup>

### Abstract

Our examinations are conducted in the period of 2004/05 – 2007/08 on ten (10) genotypes soft winter wheat (*Triticum aestivum* spp. *vulgare*): *milenka*, *bistra*, *lizinka*, *altana*, *mila*, *orovcanka*, *olga*, *agrounija prima*, *podobrena orovcanka* and *pelisterka*, whereupon, the main aim was to determine their production characteristics, the impact of used agrotechnics and soil and climatic conditions and to recommend the best varieties for production in Republic of Macedonia and in the region.

The highest average yield, irrespective of the year, gave the variety *agrounija prima* (5930 kg/ha), and the smallest (4660 kg/ha) variety *lizinka*, that is absolutely for 1270 kg/ha or relatively for 27,25% more. The most yield interesting varieties were the varieties *agrounija prima* (5930 kg/ha), *mila* (5760 kg/ha), *olga* (5330 kg/ha) and *milenka* (5115 kg/ha). These varieties could serve in the future production for getting high and economical yields as well as basic genetic material in the selection for creating varieties with high producing potential.

**Key words:** yield, genotype, varieties, production characteristics

### Introduction

The soft wheat (*Triticum aestivum* spp. *vulgare*) is the main grain crop and the most important bread wheat in the world. Relatively low and not stabile average yields of this crop, and the bigger need and request of this crop in world frames, affect to continue with further examinations of this crop, from different aspects, to stabilize and increase the yield.

For this, besides other things, it is necessary to make a systematic approach in the selection of high yield genotypes of wheat, and to be used appropriate agro technique that will guarantee success and achieving the aim. For this purpose, the plant breeders in Republic of Macedonia, for now, successfully have created a lot of new varieties that have morphological, biological, and quality and quantity features that respond to the needs of the producers and the industry, and are adaptable to the soil and climatic conditions of the growing region.

In our examinations we made an effort to cover this problem with only aim, to analyze their productive features and to recommend the best genotypes to the producers and the industry in Republic of Macedonia and the region.

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### Material and methods

The examinations were conducted in field and laboratory conditions. The field examinations were set on the experimental field of the Faculty of agriculture on the University „Goce Delcev“ – Stip, in Strumica, in the period of four years: 2004/05, 2005/06, 2006/07, 2007/08. Ten varieties of soft winter wheat was used: *milenka*, *bistra*, *lizinka*, *altana*, *mila*, *orovcanka*, *olga*, *agrounija prima*, *podobrena orovcanka* and *pelisterka*.

The experiment was consisting of three repetitions with ten variants, deployed by randomized block system, with dimension of the main parcel of 5 m<sup>2</sup>. Distance between variants was 50 cm, and between repetitions 100 cm. Distance between rows was 20 cm. Seeding rate was 300 kg/ha or 30 g/m<sup>2</sup> or 6 000 000 – 6 500 000 grains per ha. In all years of examinations before wheat, potato was planted and the soil was prepared in the same way. Therefore, every autumn, plowing of the soil was done in deepness of 35 cm, and was fertilized with 300 kg/ha NPK fertilizer with combination 15:15:15. After that, the soil additionally was tilled.

In all years of the examination, seeding was made almost in same period, when there were optimal conditions for it. In the first year the seeding was on 5.11.2004, in the second year, on 15.11.2005, in the third year on 15.11.2006 and in the fourth year on 23.11.2007. The seeding was handmade, on deepness of 5 – 6 cm. Standard agro technical measures were used for field production of wheat, so the sowing was protected from diseases, pests and weeds. Fertilizing of the sowing each year was done with 150 kg/ha KAN 27% in stadium of tillering of the wheat.

The yield was calculated by harvest from the whole parcel on units of surface. The results were elaborated statistically by the method analyze of variance, and the differences were tested by LSD – test.

### Results and discussion

The results for the grain yield in kg/ha are shown in table 1.

From the results for grain yield it could be seen that it is from 2320 – 9300 kg/ha. Irrespective the years and the genotypes, the common average yield of grain yield is 5186 kg/ha.

In the first year of examination (2004/05), the average yield was 4466 kg/ha. The highest grain yield in this year of examination gave the variety *podobrena orovcanka* (5140 kg/ha), and the smallest (3660 kg/ha) the variety *orovcanka*. Statistically certain difference of the grain yield for the examined varieties in 2004/05 was not got.

In the second year of examination (2005/06), the average yield was 5602 kg/ha. The highest grain yield in this year of examination gave the variety *olga* (7160 kg/ha), and the smallest (4560 kg/ha) the variety *podobrena orovcanka*. Statistically certain difference of the grain yield in 2005/06 was got for the varieties *bistra*, *lizinka*, *mila*, *orovcanka*, *olga*, *agrounija prima* and *pelisterka*, at level of possibility 0,05 respectfully to the variety *milenka*. In the second year of examination, statistically certain difference of the grain yield was got at level of possibility 0,01 between the varieties *bistra*, *mila*, *orovcanka*, *olga* and *agrounija prima*, respectfully to the standard variety.

In the year 2006/07 of examination, the average yield was 3298 kg/ha. The highest grain yield in this year of examination gave the variety *bistra* (4120 kg/ha), and the smallest (2320 kg/ha) the variety *podobrena orovcanka*. Statistically certain difference of the grain yielded in 2006/07 was got for the varieties *bistra*, *olga*, *podobrena orovcanka* and *pelisterka*, at level of possibility 0,05 respectfully to the variety *milenska*.

In the fourth year of examination (2007/08), the average yield was 7380 kg/ha. The highest grain yield in this year of examination gave the variety *agrounija prima* (9300 kg/ha), and the smallest (5000 kg/ha) the variety *lizinka*. Statistically certain difference of the grain yield for the examined varieties in 2007/08 was not got.

Table 1. Grain yield in kg/ha of soft winter wheat

Variety	Year				Average by variety
	2004/05	2005/06	2006/07	2007/08	
Milenska	4 540	4 620	3 500	7 800	5115
Bistra	4 700	6 020**	4 120*	8 000	5710
Lizinka	4 880	5 080*	3 680	5 000	4660
Altana	3 900	4 980	3 320	7 440	4910
Mila	4 080	6 120**	3 740	9 100	5760
Orovcanka	3 660	6 160**	3 680	5 940	4860
Olga	4 000	7 160**	3 020*	7 140	5330
Agrounija prima	4 880	6 260**	3 280	9 300	5930
Pod. Orovcanka	5 140	4 560	2 320*	7 240	4815
Pelisterka	4 880	5 060*	2 320*	6 840	4775
Average by year	4 466	5 602	3 298	7 380	5186
LSD 0,05	n.s.	433,3	400,0	n.s.	Common average
0,01	n.s.	626,7	n.s.	n.s.	

The highest average grain yield of the four year examination was got in the fourth (2007/08) year (7380 kg/ha), that is absolutely for 4082 kg/ha or 123,78% more than the grain yield in the third year of examination (3298 kg/ha), or absolutely for 2914 kg/ha or relatively for 65,24% more than the grain yield in the first year of examination (4466 kg/ha), and absolutely for 1778 kg/ha or 31,74 % more than the grain yield in the second year of examination (5602 kg/ha).

From the results it could be note that the biggest average grain yield, irrespective the year, gave the variety *agrounija prima* (5930 kg/ha), and the smallest (4660 kg/ha) variety *lizinka*, that is absolutely for 1100 kg/ha or relatively for 27,25 % more.

Irrespective the year and climatic conditions, good average grain yield gave also the other examined varieties.

The variety *mila* (5760 kg/ha) compared with variety *lizinka* (4660 kg/ha) gave bigger yield absolutely for 1100 kg/ha or relatively for 23,60 % more.

The variety *bistra* (5710 kg/ha) compared with variety *lizinka* (4660 kg/ha) gave bigger yield absolutely for 1050 kg/ha or relatively for 22,53 % more.

The variety *olga* (5330 kg/ha) compared with variety *lizinka* (4660 kg/ha) gave bigger yield absolutely for 670 kg/ha or relatively for 14,38 % more.

The variety *milenka* (5115 kg/ha) compared with variety *lizinka* (4660 kg/ha) gave bigger yield absolutely for 455 kg/ha or relatively for 9,76 % more.

Irrespective the climatic conditions in the years of examinations, the most yieldable varieties are: *agrounija prima* (5930 kg/ha), *mila* (5760 kg/ha), *bistra* (5710 kg/ha), *olga* (5330 kg/ha) and *milenka* (5115 kg/ha). These genotypes are most suitable for achieving relatively high yield and these varieties could serve as future genetic basic material in the plant breeding for creating varieties with like features.

Also, it could be note that the differences that appear between the varieties in same growing conditions are due to the different genetic specifications of the varieties for giving high grain yield.

### Conclusion

According to the four year examination, the following conclusions could be made:

- The average yield of wheat in Republic of Macedonia for the period 2000 – 2007 is 2670 kg/ha (State Statistical Office of republic of Macedonia);
- The biggest average grain yield irrespective the year, gave the variety *agrounija prima* (5930 kg/ha), and the smallest (4660 kg/ha) variety *lizinka*, that is absolutely for 1270 kg/ha or relatively for 27,25 % more;
- Irrespective the climatic conditions in the years of examination, the most yieldable varieties are *agrounija prima* (5930 kg/ha), *mila* (5760 kg/ha), *bistra* (5710 kg/ha), *olga* (5330 kg/ha) and *milenka* (5115 kg/ha). These genotypes are the most suitable for achieving relatively high yield and could serve as basic genetic material in the selection for creating varieties with high producing potential;
- The average grain yield got from our examinations (5186 kg/ha) compared to the general average yield of the wheat in Republic of Macedonia for the period 2000 – 2007 (2670 kg/ha), it could be seen that it is bigger absolutely for 2516 kg/ha or relatively for 94,23 %.
- Varieties *agrounija prima*, *mila* and *bistra* could be recommended as the most suitable and the most stabile genotypes for getting high yield and could be included in the production more, so the total production and the average yield by unit of surface will be increased;
- The differences that appear between the varieties grown in same conditions are due to the different genetic specifications of the varieties for creating high grain yield.

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