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QUANTITATIVE CHARACTERISTICS OF SOME MACEDONIAN WHEAT VARIETIES IN SYSTEM OF ORGANIC PRODUCTION

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ABSTRACT

During the period of 2004/05-2007/08 in Strumica region examinations were conducted with ten genotypes soft winter wheat (*Triticum aestivum* spp. *vulgare*): *milenka*, *bistra*, *lizinka*, *altana*, *mila*, *orovanka*, *olga*, *agrounija prima*, *podobrena orovcanka* and *pelisterka*. The main aim was to determine their production characteristics in conditions of organic production and to recommend the most yieldable varieties for organic production in Republic of Macedonia and the region.

Irrespective the climatic conditions in the years of examination, the most yieldable are the varieties *mila* (7380 kg/ha), *bistra* (6945 kg/ha) and *agrounija prima* (6875 kg/ha). These genotypes are most suitable for organic system of production for reaching relatively high yield. These varieties could also serve as future genetic material in plant breeding for creating new genotypes suitable for organic production

Key words: wheat; organic; varieties; yield.

INTRODUCTION

The soft wheat (*Triticum aestivum* spp. *vulgare*) is the main grain crop and the most important bread wheat in the world. The world tendency for producing healthy food requires the necessity in Republic of Macedonia to determine the yields of this crop or the yields of the genotypes that use the producers.

The Organic production in Republic of Macedonia is regulated with legislation for organic production that is in agreement with the EU regulative, which means that it is forbidden, or with some exceptions is allowed, the use of agro-chemicals (mineral fertilizers and different pesticides) and it tends to correctly use of the soil with its store, increasing its fertility and biological activity, content of organic matter, improving the structure, coordination and proper management in terms of choice of crops, plant species and genotypes, crop rotations, selection and ways of treatment of soil, adequate fertilization without the use of artificial mineral fertilizers, protection from diseases, pests and weeds with pre-set measures, particularly with biological agromerki, strengthen resistance to forward the above, that choice and selection of genotypes suitable for this type of production etc.

In September 2007, Ministry of agriculture forestry and watery in Republic of Macedonia, made the National Strategy with action plan for Organic Agriculture of Republic of Macedonia for the period of 2008 – 2011.

In our examinations we made analysis of some production features of some Macedonian wheat genotypes in organic production and to recommend the best varieties to the producers and to the industry in Republic of Macedonia and the region, to whom the main aim is producing healthy food.

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 m². 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/m² 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 DISCUSION

The results for grain yield in kg/ha got in organic production is shown in Table 1. The results say that the grain yield is moving within 4560 kg/ha to 7120 kg/ha. Irrespective the year and genotypes, the common average grain yield at organic wheat production is 6568 kg/ha.

In the first year of examination (2004/05), the average grain yield of wheat is 6704 kg/ha. The highest average grain yield for this year gave the variety *mila* (8400 kg/ha), and the smallest variety *pelisterka* (5640 kg/ha). In the second year of examination (2005/06), the average grain yield of wheat, irrespective the genotypes, is 6270 kg/ha. The highest average grain yield for this year gave the variety *olga* (6880 kg/ha), and the smallest variety *milenka* (4560 kg/ha). Statistically significant difference in 2005/06 for the grain yield at organic production is reached at all varieties on level of probability of 0,05 regarding the variety *milenka*. Compared with the varieties there are statistically significant differences.

In 2007 the average grain yield of wheat, irrespective the genotypes, is 6398 kg/ha. The highest average grain yield for this year gave the variety *agrounija prima* (7120 kg/ha), and the smallest (5820 kg/ha) variety *pelisterka*.

Table 1. Grain yield of soft wheat in kg/ha got from organic production

Variety	Year				Average by variety
	2004/05	2005/06	2006/07	2007/08	
<i>Milenka</i>	6140	4560	6520	8060	6320
<i>Bistra</i>	6520	6580*	6520	8160	6945
<i>Lizinka</i>	6340	6520*	6120	6300*	6320
<i>Altana</i>	6140	5680*	6080	6040*	5985
<i>Mila</i>	8400	6640*	6640	7840	7380
<i>Orovcanika</i>	7020	6320*	7060	6240*	6660
<i>Olga</i>	7080	6880*	5440	6540*	6485
<i>Agrounija prima</i>	7120	6620*	7120	6640*	6875
<i>Pod. orovcanika</i>	6640	6220*	6660	6760*	6570
<i>Pelisterka</i>	5640	6680*	5820	6440*	6145
Average by year	6704	6270	6398	6902	
LSD 0,05	H.C.	448,3	H.C.	522,6	6568
0,01	H.C.	H.C.	H.C.	H.C.	Overall average

In 2008, the average grain yield of wheat, irrespective the genotypes, is 6902 kg/ha. The highest average grain yield for this year gave the variety *bistra* (8160 kg/ha), and the smallest variety *orovcanka* (6240 kg/ha). Statistically significant difference in 2007/08 for the grain yield at organic production is reached at varieties *lizinka*, *altana*, *orovcanka*, *olga*, *agrounija prima*, *podobrena orovcanka* and *pelisterka*, on level of probability of 0,05 regarding the variety *milenka*. Compared with the varieties there are statistically significant differences.

Highest average grain yield of wheat from the four year examination, irrespective the varieties is got in the fourth year of examinations (2007/08), (6902 kg/ha), which is absolutely for 632 kg/ha or 10,08 % more than the average grain yield in the second year of examinations (6270 kg/ha), when, the smallest average yield is got, or, absolutely for 504 kg/ha or relatively for 7,88 % more than the grain yield in the third year of examinations (6398 kg/ha), and absolutely for 198 kg/ha or 2,95 % more than the grain yield got in the first year of examinations (6704 kg/ha).

The difference in the average grain yield compared year by year is due to the different climatic conditions that prevailed in these years.

The highest average grain yield, irrespective the year, gave the variety *mila* (7380 kg/ha), and smallest (5985 kg/ha) variety *altana*, that is absolutely for 1395 kg/ha or relatively for 23,31 % more.

Irrespective the climatic conditions in the years of examinations, at organic production, the most yieldable varieties are *mila* (7380 kg/ha), *bistra* (6945 kg/ha) and *agrounija prima* (6875 kg/ha). These genotypes are the most suitable for that system of production for reaching of relatively high yield and we recommend them for organic wheat production.

In this, it could be noted that the differences that appear between the varieties grown in same conditions are due to the different genetic intention of the varieties for giving high grain yield.

Comparing the overall average grain yield (6568 kg/ha) with the average grain yield of each variety, it could be said that it is bigger than the grain yield at varieties *milenka*, *lizinka*, *altana*, *olga* and *pelisterka*, and is smaller than the grain yield at varieties *bistra*, *mila*, *orovcanka*, *agrounija prima* and *podobrena orovcanka*.

CONCLUSIONS

Based on the four year examinations (2004/05, 2005/06, 2006/07, 2007/08) of the variety specificity, of soft wheat grown in organic production, the following conclusions could be made:

- The highest average grain yield from organic produced wheat in four year examination, irrespective the varieties, is got in 2007/08 (6902 kg/ha).
- The highest average grain yield gave the variety *mila* (7380 kg/ha).
- The smallest average grain yield, irrespective the year, gave the variety *altana* (5985 kg/ha).
- Varieties *mila*, *bistra* and *agrounija prima*, could recommend as the most suitable and the most stabile genotypes for reaching high yield at organic wheat production.
- Varieties *mila*, *bistra* and *agrounija prima*, could serve as future basic genetic material in plant breeding, for creating new varieties suitable for reaching high yields in organic production.

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