

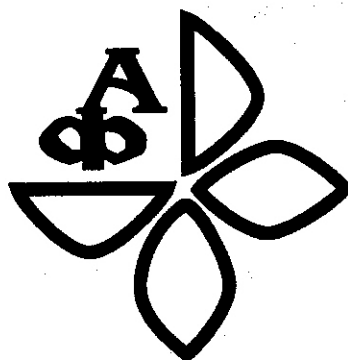
UNIVERZITET U KRAGUJEVCU
AGRONOMSKI FAKULTET U ČAČKU



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PRODUCTION CHARACTERISTICS OF OAT IN REPUBLIC OF MACEDONIA

Dragica Spasova, D. Spasov, M. Ilievski,
Biljana Atanasova, R. Kukutanovi¹

Abstract

In the period of 2005 – 2007 examinations were conducted on five oat populations (*krivogastani*, *trebenista*, *radolista*, *bugarija*, *kuceviste*) and three oat varieties (*rajac*, *slavuj* and *lovken*), whereupon, the main aim was to determine the differences in their production characteristics of the examined populations and varieties and to recommend the best oat varieties for production in Republic of Macedonia that will guarantee high and certain yield.

Different values are got for the examined characteristics, as a result of the variety specification and the year of growing. The highest average yield, irrespective of the year, gave the variety *lovken* (4366 kg/ha), and the smallest (3308 kg/ha) population *krivogastani*, that is absolutely for 1058 kg/ha or relatively for 24,30 % more. Good average yield of the grain also gave the other examined varieties and populations. The population *bugarija* and the variety *rajac* reached yield of over 4000 kg/ha, and the other yields are below that value.

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: oat, varieties, populations, yield, production characteristics

Introduction

The oat (*Avena sativa* L.) is a culture which is mainly grown for the grain and the straw. The growing areas of oat in the world are in continuous decreasing because of the low and not stabile yields, compared to the wheat and barley. This is the reason for decreasing the growing areas of oat in our country, too.

The reasons for it is growing low yield varieties and using inappropriate agro technique.

The average yield of oat in the world is 1781 kg/ha. In Macedonia oat is grown on 2162 hectares (Statistical review: Agriculture 5.4.7.01/564, July 2007) with average yield of 1746 kg/ha.

Yield got from the culture plants from always is considered as a parameter through which important conclusions could be made. The yield is variable and inconstant feature and it depends from the genetic potential of the variety, soil and climatic conditions and used agro technical measures.

¹ Faculty of Agriculture Strumica, University "Goce Delcev" – Stip, Krste Misirkov bb, 2000 Stip, Republic of Macedonia (dragica.spasova@ugd.edu.mk)

In the examinations of Bogdanović et al. (2000), grain yield of oat is different, depending of the examined genotypes, location and the soil and climatic conditions.

To increase and stabilize the yield, between else, it is necessary to make a systematic approach in selection of high yield genotypes of oat, and to be used appropriate agro technique that will guarantee success and achieving the aim. 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.

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 2005 – 2007. Laboratory examinations were done in the laboratories of the Faculty of agriculture – Skopje, and the Institute of animal husbandry – Skopje.

Five oat populations (*krivogastani*, *trebenista*, *radolista*, *bugarija*, *kuceviste*) and three oat varieties (*rajac*, *slavuj* and *lovken*) were analyzed.

The experiment was consisting of four repetitions with eight variants, deployed by randomized block system, with dimension of the main parcel of 5 m². Distance between variants was 0,50 m, and between repetitions 1,00 m. Distance between rows was 20 cm. Seeding rate was 550 grains/m² or 5 500 000 grains/ 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 done during March: 17.03.2005, 28.03.2006 and 06.03.2007. The seeding was handmade, on deepness of 5 – 6 cm.

Standard agro technical measures were used for field production of oat, 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 oat.

Before harvest, 30 plants from each parcel, respectfully 120 plants from each variant were used to calculate the grain yield by panicle.

Grain yield was calculated on the basis of grain mass from each parcel deduced to unit of area. The results were elaborated statistically by the method analyze of variance, and the differences were tested by LSD – test.

Results and discussion

Productivity of the oat depends of the grain yield by panicle.

The results for the grain yield by panicle in oat production are shown in table 1.

From the results for grain yield by panicle in oat production it could be seen that it is from 2,20 g – 4,10 g by panicle. Irrespective the years and genotypes, general average grain yield of oat, by panicle is 3,0 g.

Table 1. Grain yield by panicle in conventional oat production

Variety/population	year			Average by variety/population 2005/07
	2005	2006	2007	
Krivogastani	2,50	2,40	2,40	2,43
Trebenista	3,47	3,00**	2,60	3,00
Radolista	2,80	2,40	2,20	2,46
Bugarija	3,60*	3,00**	2,70*	3,10
Kuceviste	3,55*	3,00**	3,00**	3,20
Rajac	3,60	3,10**	3,20**	3,30
Slavuj	4,00**	3,00**	2,80**	3,30
Lovken	4,10**	3,10**	3,00**	3,40
Average by year	3,45	2,88	2,73	3,0
LSD 0,05	1,03	0,41	0,24	
0,01	1,49	0,60	0,35	

In the first year of examination (2005), the average grain yield by panicle of oat, irrespective the varieties and populations is 3,45 g. The highest grain yield by panicle in this year of examination reached variety lovken (4,10 g), and smallest (2,50 g) population krivogastani. Statistically, very certain difference in 2005 of grain yield by panicle in conventional oat production is between the standard and the slavuj and lovken. Difference is also got between the standard and krivogastani and bugarija and kuceviste.

In the next year of examination (2006) the average grain yield by panicle of oat, irrespective the varieties and populations is 2,88 g. The highest grain yield by panicle in this year of examination reached variety rajac and lovken (3,10 g), and smallest (2,40 g) population krivogastani and radolista. Compared to the standard krivogastani very significant differences showed all populations and varieties, except between krivogastani and radolista.

In 2007 the average grain yield by panicle of oat, irrespective the varieties and populations is 2,73 g. The highest grain yield by panicle in this year of examination reached variety rajac (3,20 g), and smallest (2,20 g) population radolista. Compared to the standard krivogastani there is very significant difference between varieties rajac, slavuj and lovken and the populations kuceviste and bugarija.

From the results for the grain yield by panicle in conventional oat production (table 1), it could be note that the highest average grain yield by panicle, irrespective the year, reached variety lovken (3,40 g), and smallest (2,43 g) population krivogastani, that is absolutely for 0,97 g, or relatively for 28,6% more. According to Georgieva, 1995, grain

yield by panicle vary in narrow frames, 1,30 g in variant treated with combination N_0 to 1,46 g in N_{18} .

Results for grain yield in kg/ha in conventional oat production are shown in table 2.

Table 2. Grain yield in kg/ha in conventional oat production

Variety/population	year			Average by variety/population
	2005	2006	2007	
Krivogastani	2 925	3 250	3 750	3 308
Trebenista	3 625*	3 500	3 750	3 625
Radolista	3 375	3 125	3 500	3 333
Bugarija	5 000**	3 750	3 875	4 208
Kuceviste	3 750**	3 775	4 125	3 883
Rajac	4 250**	3 625	4 625	4 166
Slavuj	4 250**	3 250	3 625	3 708
Lovken	4 775**	4 025	4 300	4 366
Average by year	3 993	3 537	3 943	3 824
LSD 0,05	510	H.C	H.C	
0,01	740	H.C	H.C	

From the results for grain yield in kg/ha in conventional oat production (table 2) it could be seen that it is from 2925 – 5000 kg/ha. Irrespective the years and the genotypes, the common average yield of grain yield is 3824 kg/ha. Compared to the standard krivogastani, in 2005, statistically very significant difference in grain yield showed all populations and varieties, except radolista, which did not show significant difference in grain yield. In this year, statistically very certain difference is got between the standard krivogastani and the average yield in the year.

In the second year of examination (2006), the average grain yield of oat was 3537 kg/ha. The highest grain yield in this year of examination gave the variety *lovken* (4025 kg/ha), and the smallest (3125 kg/ha) population radolista. Statistically certain difference of the grain yield in 2006 was not got for the examined varieties and populations.

In 2007, the average grain yield was 3943 kg/ha. The highest grain yield in this year of examination gave the variety *rajac* (4625 kg/ha), and the smallest (3625 kg/ha) the

variety *slavuj*. Statistically certain difference of the grain yield in 2007 was not got for the examined varieties and populations.

From the results for the grain yield in kg/ha in conventional oat production (table 2), it could be note that the highest average grain yield, irrespective the year, reached variety *lovken* (4366 kg/ha), and smallest (3625 kg/ha) population *krivogastani*, that is absolutely for 1058 kg/ha, or relatively for 24,30 % more.

In the examinations of Mlinar et al. (1990), for the biological and economical values of 7 native and 12 foreign varieties and line spring oat, in two experiments in 1989, at Botinec, Zagreb, Croatia, The highest total average grain yield gave the native line Bs-3-8002 (7989 kg/ha), that in both experiments gave significantly higher yield from the total average of the three standard varieties. High productive potential showed variety *Flamingsregent* (7948 kg/ha) and line Bs-3-183 (7673 kg/ha).

Irrespective the year and climatic condition, good average grain yield gave also the other examined varieties and populations. So, population *bugarija* and variety *rajac* gave over 4000 kg/ha, and the others below that value.

These genotypes are the most suitable for achieving relatively high grain yield and these varieties could serve as a future basic material in oat breeding for creating new varieties.

So, it could be note that the differences between the varieties and populations, grown in same conditions, are due to the variety specification, concerning the specificity of the genetic characteristics that own examined populations.

Conclusion

According to the three year examination, for the variety specification of the oat grown in conventional conditions of production, the following conclusions could be made:

- The highest average grain yield by panicle, irrespective the year, reached variety *lovken* (3,40 g), and smallest (2,43 g) population *krivogastani*, that is absolutely for 0,97 g, or relatively for 28,6% more;
- The highest average grain yield, irrespective the year, reached variety *lovken* (4366 kg/ha), and smallest (3625 kg/ha) population *krivogastani*, that is absolutely for 1058 kg/ha, or relatively for 24,30 % more.
- Irrespective the year and climatic condition, good average grain yield gave also the other examined varieties and populations. So, population *bugarija* and variety *rajac* gave over 4000 kg/ha, and the others below that value.
- Varieties *lovken*, *rajac* and population *bugarija* could recommend as the most suitable and the most stabile genotypes for getting high grain yield and to be more included in the production, so the total oat production would be increased.
- The differences between the varieties and populations, grown in same conditions, are due to the different genetic of the varieties for creating high grain yield.

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