THE INFLUENCE OF TECHNOLOGICAL FACTORS ON YIELD AND QUALITY OF SPRING OATS AT ARDS TURDA

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Abstract. *In our country, in recent year, spring oats is one of the most cultivated small grain cereal, the surface being 175000 ha in 2015 and 180000 ha in 2014. Among the varieties of spring oats from this experience there are genetically differences (F = 149,007 ***) in terms of productive level. Duncan's ranking put on the first place variety Mureşana with an average production of 5368 kg/ha in 2016. Mureşana variety represents a genetically progress in comparison with Mureş (4559 kg/ha) considering that is a reselection of it. Number of seed/m^2 increase spring oats production in average with 599 kg/ha. Between spring oat varieties exist differences concerning the nitrogen fertilization response, emphasizing in particular Mureşana which obtained comparable productions on both levels of fertilization: 5563 kg/ha on the dose $N_{100}P_{50}K_0$ and 5182 kg/ha on dose $N_{50}P_{50}K_0$.*

Key words: *spring oats, number of sown seeds/square meter, doses of fertilizers, protein content*

INTRODUCTION

Small grain crops, like oats, are seeing renewed interest by farmers in Romania. In our country, in recent year, spring oats is one of the most cultivated small grain cereal the surface being around 200.000 hectares. Oats contain many health-promoting substances and the grain contains no gluten.The European Food Safety Authority (EFSA) concluded that oat constituents are lowering the blood cholesterol level, which reduces the risk of heart diseases. Oats are high in potein and oil. Compared to wheat, oats contein more protein, nearly four times more fat, and lesss starch. Oats are grown for two main puposes, feed and food use. A very small percentage is grown for cover crop. Relative to other crops, oats require low inputs and can be used effectively in most crop rotation. Breeding of oat had no priority over recent years. Many of the varieties have rather long straw which makes them prone to lodging: the plants are easily falling over, which reduces yields. But oat also has a number of advantages: the crop is doing well on poor soils and crop protection is hardly needed. The plants also have a deep and extensive root system, which improves soil structure.

MATERIALS AND METHODS

The poly factorial experience with three factors (2x2x25), in three replications was organized in this way: A (number of sown seeds); B (doses of fertilizers) x C (varieties). The number of sown seeds was 250 g.s/m^2 and 500g.s./m^2 and doses of fertilizers were $N_{50}P_{50}K_0$, $N_{100}P_{50}K_0$. Sowing was done with Wintersteiger machine, at a distance of 12.5 cm between rows for 500 sown seeds/m^2 and 25 cm between rows for 250 sown seeds/m^2, sown plot being 7 m^2, and harvest of 5 m^2.

Of the studied genotypes seven are created at ARDS Turda, respectively: Mureş, Someşan and Mureşana, T. 90-81 M, T. 21-81 M, T. 38-81 M, T. 44-81M. Other six genotypes are from Romania, respectively: LV. 4324-86, LV. 4325-86, LV. 4362-86, LV. 4363-86, LV. 8644-82 and Lv. 7478-82 and 12 have foreign origin. Experimental results were processing by ANOVA, based on Fisher criterion (F).

RESULTS AND DISCUSSIONS

Most major productions were obtained at variant with 500 g.s/sq.m in comparison 250 g.s./sq.m on doses of fertilizers $N_{100}P_{50}K_0$ and the difference varied from 200 to 1000 kg/ha, depending on the variety. As can be seen in figure 1 the largest productions at 250g.s./sq.m were obtained through Mureşana and LV. 4363-86 varieties.

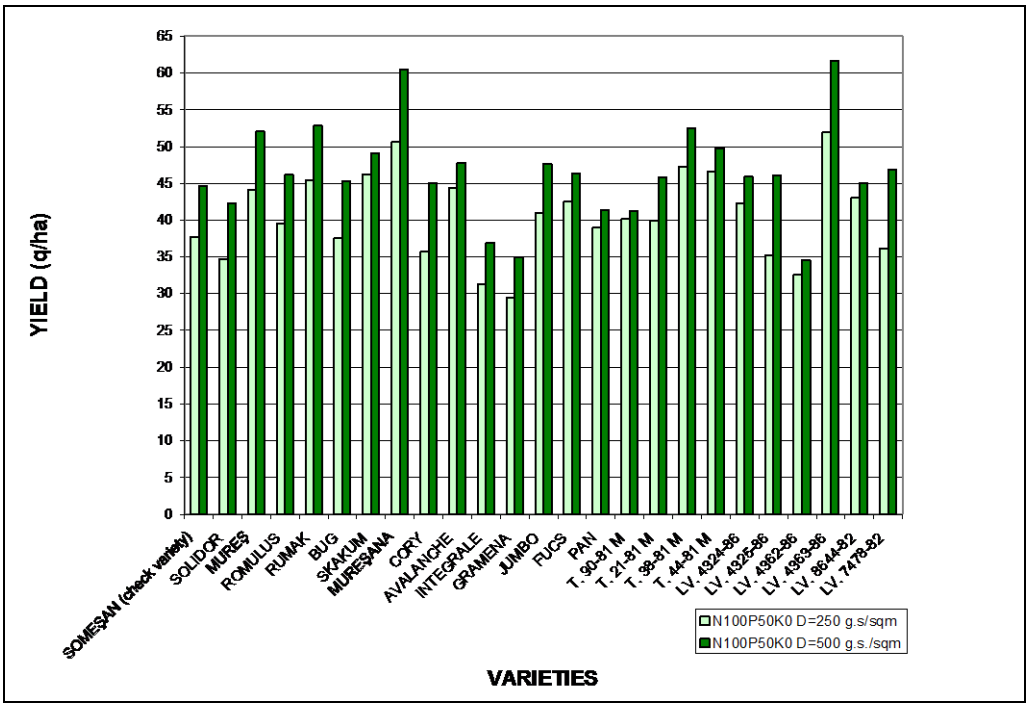

Figure 1 The influence of number of sown seeds in spring oats varieties yields on doses of fertilizers $N_{100}P_{50}K_0$ (Turda, 2016)

At six of varieties are obtained productions higher with 900 kg/ha on variant with 500 g.s/sq.m in comparison with the variant when were used 250 g.s/sq.m (figure 2) at doses of fertilizers $N_{50}P_{50}K_0$.

Many researches have pointed out that small grain crops production depends on three elements, namely: the number of spikes/m^2, number of grains/spike and thousand kernels weight. In general, is difficult to combine all three elements of productivity in the same genotype. Some researchers believe that the number of spikes/m^2 is the most important element of productivity that must be fixed in a genotype, and others have shown that the number of grains/spike and thousand kernel weight (TKW) may have countervailing effects. Number of spikes/m^2 depends greatly on the number of seeded seeds ensured to sowing. In spring oats between thousand kernels weight and production a positive correlation exist (figure 3). Even if the correlation coefficient is not high (r= 0,129), Mureşana variety confirm for example. This variety due it's higher productivity to a better resistance to lodging and shattering.

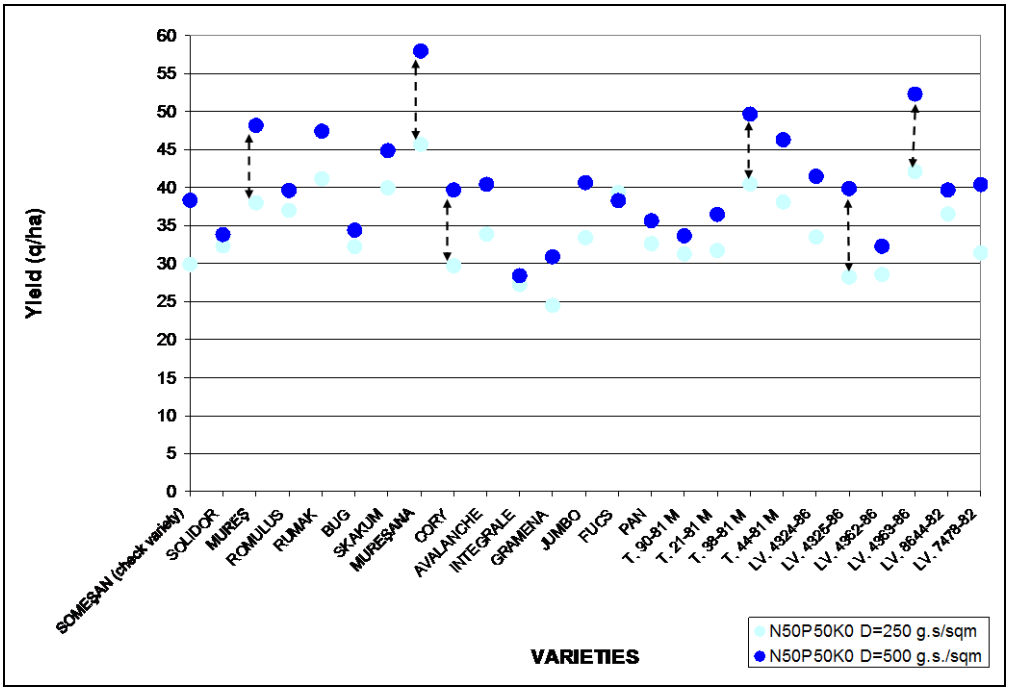

Figure 2. The influence of number of sown seeds in spring oats varieties yields on doses of fertilizers $N_{50}P_{50}K_0$ (Turda, 2016)

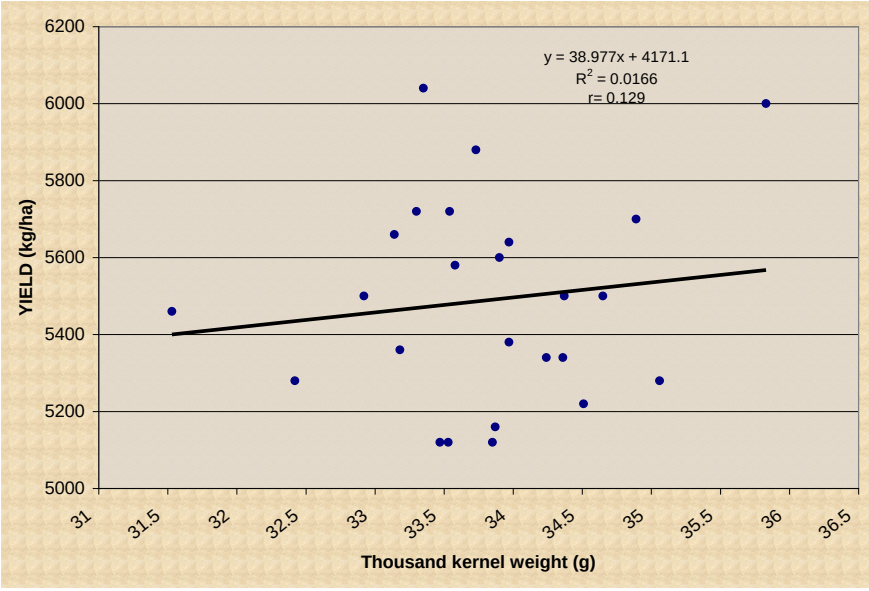

Figure 3 Correlation between thousand kernel weight and yield on spring oats (25 cases)

Several researchers, including Ohm (1976), Schrickel et all (1992), Tibelius and Klinck(1986), studied the influence of technology elements on oats production.

Reaction to fertilization of spring oats varieties are different, varied from 230 kg/ha (Lv. 4362-86) to 1093 kg/ha (Bug) on the level of fertilizers **$N_{100}P_{50}K_0$.** We emphasize particularly even in the year 2016 the variety Mureşana which obtained high level of productions on both levels of fertilization (table 1).

Table 1

The influence of technological factors on the yield (q/ha) of spring oats in 2016, in Turda conditions

No.	Varieties of oats	Yield (q/hectare) 500 seeds/sq. m		Differences between yields (kg/ha) $N_{100}P_{50}K_0$ $N_{50}P_{50}K_0$	Yield (q/hectare) 250 seeds/sq. m		Differences between yields (kg/ha) $N_{100}P_{50}K_0$ $N_{50}P_{50}K_0$
		$N_{100}P_{50}K_0$	$N_{50}P_{50}K_0$		$N_{100}P_{50}K_0$	$N_{50}P_{50}K_0$	
1	**SOMEŞAN (check variety)**	44,70	38,33	637	37,83	29,90	793
2	**SOLIDOR**	42,27	$33,83^{00}$	844	$34,67^{0}$	32,33	234
3	**MUREŞ**	$52,10^{xxx}$	$48,20^{xxx}$	390	$44,07^{xxx}$	$38,00^{xxx}$	607
4	**ROMULUS**	46,17	39,63	654	39,57	$37,00^{xxx}$	257
5	**RUMAK**	$52,83^{xxx}$	$47,43^{xxx}$	540	$45,37^{xxx}$	$41,17^{xxx}$	420
6	**BUG**	45,33	$34,40^{00}$	1093	37,63	32,23	540
7	**SKAKUM**	$49,07^{xx}$	$44,87^{xxx}$	420	$46,27^{xxx}$	$39,97^{xxx}$	630
8	**MUREŞANA**	$60,43^{xxx}$	$57,97^{xxx}$	246	$50,63^{xxx}$	$45,67^{xxx}$	496
9	**CORY**	45,03	39,70	533	35,67	29,73	594
10	**AVALANCHE**	$47,80^{x}$	40,43	737	$44,43^{xxx}$	$33,87^{xx}$	1056
11	**INTEGRALE**	$36,93^{000}$	$28,40^{000}$	853	$31,27^{000}$	27,23	404
12	**GRAMENA**	$34,93^{000}$	$30,90^{000}$	403	$29,43^{000}$	$24,50^{000}$	493
13	**JUMBO**	$47,63^{x}$	40,67	696	$41,00^{x}$	$33,40^{x}$	760
14	**FUCS**	46,40	38,30	810	$42,53^{xxx}$	$39,37^{xxx}$	316
15	**PAN**	$41,37^{0}$	$35,63^{0}$	574	39,00	$32,63^{x}$	637
16	**T. 90-81 M**	$41,23^{0}$	$33,67^{000}$	756	40,13	31,27	886
17	**T. 21-81 M**	45,77	36,47	930	39,90	31,73	817
18	**T. 38-81 M**	$52,53^{xxx}$	$49,67^{xxx}$	286	$47,20^{xxx}$	$40,47^{xxx}$	673
19	**T. 44-81 M**	$49,80^{xxx}$	$46,30^{xxx}$	350	$46,60^{xxx}$	$38,10^{xxx}$	850
20	**LV. 4324-86**	45,90	$41,50^{x}$	440	$42,30^{xx}$	$33,50^{xx}$	880
21	**LV. 4325-86**	46,13	39,87	626	35,27	28,23	704
22	**LV. 4362-86**	$34,57^{000}$	$32,27^{000}$	230	$32,60^{000}$	28,57	403
23	**LV. 4363-86**	$61,67^{xxx}$	$52,30^{xx}$	937	$51,93^{xxx}$	$42,10^{xxx}$	983
24	**LV. 8644-82**	45,00	39,70	530	$43,03^{xxx}$	$36,53^{xxx}$	650
25	**LV. 7478-82**	46,80	40,40	640	36,17	31,43	474
	LSD 5%	2,69					
	LSD 1%	3,55					
	LSD 0,1%	4,56					

At spring oats, like wheat, between production and protein content there is a negative correlation (figure 4). This is shown by the downward slope of regression line, correlation and regression coefficients having different values depending on the level of fertilization (r= - 0,197 and r= - 0,324; a= -0,0004 and a= -0,0008).

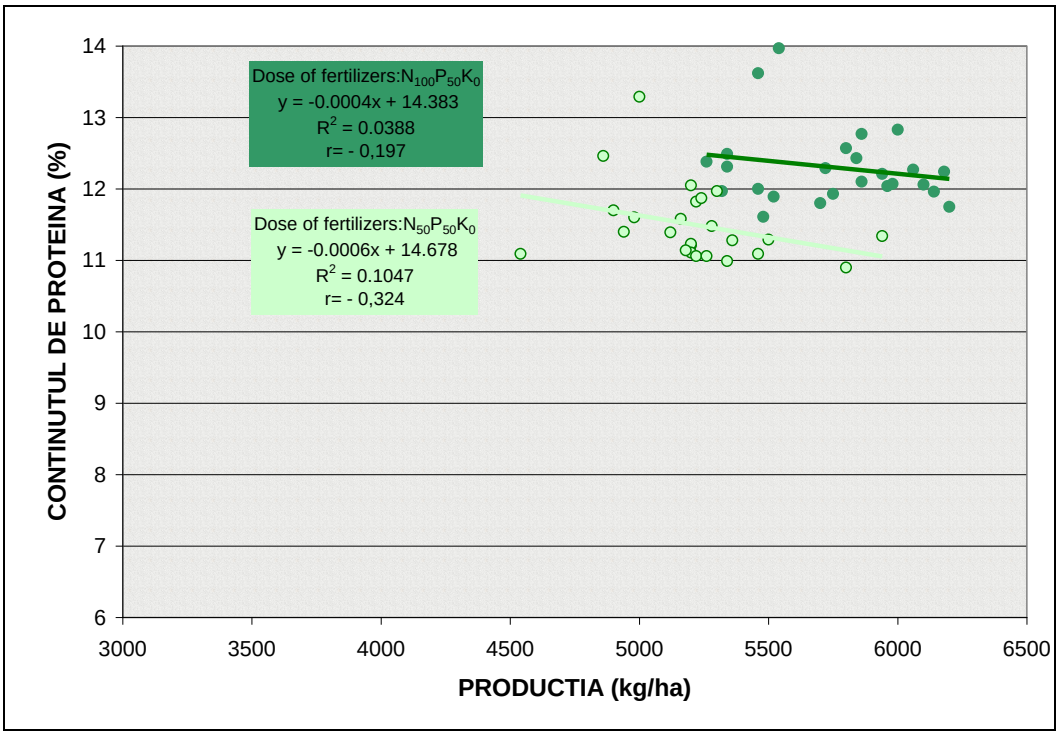

Figure 4 Correlation between yield (kg/ha) and protein content (%) of spring oat varieties tested at ARDS Turda

CONCLUSIONS

The results of the 2016 variety trial will further improve our understanding of the barriers and opportunities of spring oats.

Selling grain into a specialty market (i.e., for human consumption) takes an increased level of management and care for the final product.

Of the varieties screened in these trials, Mureana was high yielding in all experimental variants due the fact that it has great values of thousand kernel weight.

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