THE CULTIVAR INFLUENCE ON WHEAT YIELD QUALITY IN THE CRIŞURILOR PLAIN CONDITIONS

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Abstract: The researches were carried out during 2006-2008 on the preluvosoil from Agricultural and Development Research Station Oradea characterized by the presence of the horizons Bt_1 (34-54 cm depth) and Bt_2 (54-78 cm depth); the colloid clay eluviation determined to appear the El horizon with 31.6% colloid clay. On 0-20 cm depth, the soil has a big percentage of macroagregates (Φ > 0.25 mm), 47.5% bulk density is of 1.41 g/cm^3 and total porosity is median one, hydraulic conductivity is of 21.0 mm/h. The values of the pH indicates a low acid soil, humus, total nitrogen, phosphorus and potassium content are low. The source of irrigation water was a drill of 15 m depth. The chemical parameters of the irrigation water were the following: fixed mineral residue 0.5 g/l; SAR index 0.52; CSR index= -1.7%; N. Florea class = II; there are not some problemes regarding the use of irrigation use. We use 5 Romanian wheat cultivar: Dropia, Crişana, Arieşan, Alex, Ardeal. In comparison with the Dropia are insignificant difference statistically in Crişana, Alex and Ardeal and negative distingue significant in Arieşan. Wet gluten and dry gluten of the cultivars Dropia, Crişana and Arieşan had not the differences statistically assured. In comparison with Dropia cultivar, in Alex and Ardeal, very significant and distingvely significant differences were registered. Falling number was improve very significant statistically in comparison with Dropia in Crişana (64.3%) and Alex (20,0%) but the values are included in the class with bad falling number, in Arieşan the difference is insignificant statistically and in Ardeal the difference is negative distingue significant. All 5 cultivars had very good values of the deformation index. The best value was obtained in Alex (4 mm) and Crişana (5 mm).The researches were carried out in the project: PN-II-ID-PCE-2008; 1103/2009 ”Study of the relationships in the soil-water-plant-atmosphere system on the land affected succesivelly by excess and deficit of moisture from North Western Romania regarding the improve of the yield quantity and quality”.

INTRODUCTION

The wheat yield quality is influenced by the world area where is cropped (MUNTEAN., L., and all., 2008) and the crop technology, alone or in interaction: cultivar (Puşca I. Et all, 2008) crop rotation (BANDICI GH. 1997, ARDELEAN I., 2006, DOMUŢA C., 2008), fertilization system (CIOBANU GH., 2003), irrigation (DOMUŢA C., 2008, 2009).

After the year 1990, the panification quality of the Romanian wheat cultivar, had an unjustified appreciation. Many government factors appreciated the Romanian cultivars for fodders, only for the wheat import justification. There was a completely false appreciation because the research programmes of the National Institute for Agricultural Research and Development Fundulea and of the researches stations from Lovrin, Turda, Oradea, Suceava, Şimnic, Teleorman, had the objective to realize the cultivars with high capacity of yield, good and very good quality for panification, high degree of adaptability to the environment tolerance and adaptability to drought and frost – high tolerance and adaptability to diseases (PUŞCĂ I. and all, 2008).

In Agricultural Research and Development Station Oradea, Gheorghe Bunta created the wheat cultivar called *Crişana* and the paper analyzed the panification quality of this soil in

comparison with other four Romanian cultivars, very known.

MATERIAL AND METHODS

The research were carried out in Agricultural Research Station Oradea on a preluvosoil characterized by a humus content of 2,1% in the Ap (0-20cm depth) horizon, pH of 6,3, phosphorus of 31,5 ppm and potassium of 190,2 ppm; the value of the bulk density is of 1,44 g/cm^3 and the total porosity is about 47%. Field capacity (24,3%) and wilting point (9,1%) have the median values.

The experiment includes five Romanian cultivars: Dropia – the cultivar with the biggest cropped surfaces in Romania, was considered like control *Crişana* – new cultivar created by Gheorghe Bunta in Agricultural Research Station Oradea, *Arieşan, Alex,* and *Ardeal*. The experiment was placed in 4 repetitions after the block method. The surface of the experiment plot = 50 m^2. The fertilization system consists of $N_{120}P_{90}K_{60}$. All the technology elements were established like optimum ones.

RESULTS AND DISCUSSIONS

Influence of the cultivar on the level yield

In average on the studied period, the smallest wheat yield was obtained in *Dropia* 3840 kg/ha. The yield gain obtained in *Crişana* cultivar (1010 kg/ha) in comparison with *Dropia* was very significant statistically; the yield gains obtained in *Alex* (613 kg/ha) and *Arieşan* (473 kg/ha) were distinque significant statistically and the yield gain obtained in Ardeal (273 kg/ha) was significant only. There were not every year the biggest yield in *Crişana,* in 2007 and 2009 the biggest yields were obtained in *Alex* but the differences in comparison with *Crişana* were small. In the *Crişana* cultivar was obtained the biggest yield in the year 2009 (table 1.).

The cultivar influence on 1000 grains weight and on test weight

In comparison with the control (*Dropia)* in average on 200-2009 the significant increase (6,2%) of 1000 grains wheight was registered in *Crişana,* in *Arieşan* the difference (-3,5%) was unsignificant statistically, in *Alex* the difference (-12,8%) was distinque significant and in *Ardeal* the difference (-15,5%) was very significant statistically (table 2).

The best weight in *Dropia* was of 79,1 kg/hl. Only in *Arieşan* was registered a value of the test weight statistically assured 77,3kg/hl (table 3).

The influence of the cultivar in the gluten content

The wet gluten content of the *Dropia* grains was of 31.3%. The value determined in *Crişana* (33.0%) and *Arieşan* (30.7%) were not different significant statistically in comparison with *Dropia.* The values registered in *Alex* (24.6%) and *Ardeal* (27.1 %) are smaller than *Dropia,* very significant and distinque significant (table 4).

The same sense of the statistical significant was registered regarding the dry gluten content of the grains. The *Crişana* cultivar had the biggest dry gluten content (21.8 %) but the difference registered in comparison with *Dropia* is insignificant statistically, in *Arieşan* the difference (0.3%; 1.4%) is insignificant statistically too. The difference registered in *Alex* (6,6%, - 30,9%) and *Ardeal* (-3.9; -18.3%) are very significant and distingue significant respectively (table 5).

The influence of the cultivar on falling number

All the studied cultivars had a bad falling numbers *Dropia's* falling number was of 70 sec. The differences very significant statistically in comparison with *Dropia* were registered in *Crişana* (64.3%) and in *Alex* (20.0%); the difference (-4.3%) registered in *Arieşan* is significant statistically and the differences (-14.3 %) registered in *Ardeal* is distingue significant (table 6)

Table 1

The influence of cultivar on wheat yield, Oradea 2007-2009

Cultivar	Yield		Difference		Statistical signification
	Kg/ha	%	Kg/ha	%	
2007					
1. Dropia	3120	100	-	-	Mt.
2. Crişana	3760	120,5	640	20,5	***
3. Arieşan	3540	113,5	420	13,5	**
4. Alex	3820	122,4	700	22,4	***
5. Ardeal	3890	124,7	770	24,7	***
LSD 5% - 190 LSD 1% - 370 LSD 0,1% - 610					
2008					
1. Dropia	2960	100	-	-	Mt.
2. Crişana	4830	163,1	1870	63,1	***
3. Arieşan	3610	121,9	650	21,9	**
4. Alex	3430	115,9	470	15,9	**
5. Ardeal	3210	108,4	250	8,4	-
LSD 5% - 270 LSD 1% - 425 LSD 0,1% - 790					
2009					
1. Dropia	5440	100	-	-	Mt.
2. Crişana	5960	109,6	520	9,6	**
3. Arieşan	5790	106,4	350	6,4	*
4. Alex	6110	112,3	670	12,3	***
5. Ardeal	5240	96,3	-200	-3,7	0
LSD 5% -170 LSD 1% - 360 LSD 0,1% - 580					
2007-2009					
1. Dropia	3840	100	-	-	Mt.
2. Crişana	4850	126,3	1010	26,3	***
3. Arieşan	4313	112,3	473	12,3	**
4. Alex	4453	115,9	613	15,9	**
5. Ardeal	4113	107,1	273	7,1	*
LSD 5% - 210 LSD 1% - 385 LSD 0,1% - 660					

Table 2

Cultivar influence on 1000 grains weight in wheat, Oradea 2007-2009

Cultivar	1000 grains weight		Difference		Statistical signification
	g	%	g	%	
1. Dropia	46.7	100	-	-	Control
2. Crişana	49.6	106.2	2.9	6.2	*
3. Arieşan	45.1	96.5	-1.6	-3.5	-
4. Alex	40.7	87.2	-6.0	-12.8	00
5. Ardeal	39.5	84.5	-7.2	-15.5	000

LSD 5% - 1.9   LSD 1% - 3.5 LSD 0,1% - 6.4

Table 3

Cultivar influence on test weight in wheat, Oradea 2007-2009

Cultivar	MH		Difference		Statistical signification
	Kg/hl	%	Kg/hl	%	
1. Dropia	79.1	100	-	-	Control
2. Crişana	78.4	99.1	-0.7	-0.9	-
3. Arieşan	77.3	97.7	-1.8	-2.3	00
4. Alex	79.3	100.2	+0.2	+0.2	-
5. Ardeal	78.6	99.4	-0.5	-0.6	-

LSD 5% - 1,1   LSD 1% - 2,1 LSD 0,1% - 4,2

Table 4

Cultivar influence on test weight in wheat, Oradea 2006-2008

Cultivar	MH		Difference		Statistical signification
	Kg/hl	%	Kg/hl	%	
1. Dropia	79.1	100	-	-	Control
2. Crişana	78.4	99.1	-0.7	-0.9	-
3. Arieşan	77.3	97.7	-1.8	-2.3	00
4. Alex	79.3	100.2	+0.2	+0.2	-
5. Ardeal	78.6	99.4	-0.5	-0.6	-

LSD 5% - 1.1   LSD 1% - 2.1   LSD 0,1% - 4.2

Table 5

Cultivar influence on dry gluten content of the wheat grains, Oradea 2007-2009

Cultivar	Dry gluten		Difference		Statistical signification
	%	%	%	%	
1. Dropia	21.4	100	-	-	Control
2. Crişana	21.8	101.8	+0.4	1.8	-
3. Arieşan	21.1	98.6	-0.3	-1.4	-
4. Alex	14.8	69.1	-6.6	-30.9	000
5. Ardeal	17.5	81.7	-3.9	-18.3	00

LSD 5% - 2.5   LSD 1% - 3.8   LSD 0.1% - 6.2

Table 6

Cultivar influence on falling number in wheat crop, Oradea 2007-2009

Cultivar	Falling number		Difference		Statistical signification
	Sec.	%	Sec.	%	
1. Dropia	7.0	100	-	-	Control
2. Crişana	115	164.3	+45	64.3	***
3. Arieşan	67	95.7	-3	-4.3	-
4. Alex	84	120.0	+14	20.0	***
5. Ardeal	60	85.7	-10	-14.3	00

LSD 5% - 5   LSD 1% - 9   LSD 0,1% - 13

Cultivar influence on deformation index

All the cultivars had very good deformation index. In comparison with the control, *Dropia*, the values of the deformation index improved distingue significant statistically (-26,9%) in *Crişana*. The values of the deformation index increased in comparison with *Dropia* distingue significant in *Arieşan* and significant statistically in *Ardeal* (table 7).

Table 7

Cultivar influence on deformation index in wheat crop, Oradea 2007-2009

Cultivar	Deformation index		Difference		Statistical signification
	mm	%	mm	%	
1. Dropia	7	100	-	-	Control
2. Crişana	5	71.4	-2	-29.6	0
3. Arieşan	10	142.8	+3	42.8	**
4. Alex	4	57.1	-3	-42.9	00
5. Ardeal	9	128.5	+2	28.5	*

LSD 5% - 1.5   LSD 1% - 2.7   LSD 0.1% - 5.6

The experiment emphasized the importance of the wheat cultivar choice especially regarding the yield quality because there is on important difference between the cultivars quality.

CONCLUSIONS

During 2007-2009, in Oradea, 5 Romanian wheat cultivars were studied and the following conclusions were established:

• In comparison with the *Dropia,* the cultivar with the biggest cropped surfaces in the cultivar, *Crişana* very significant statistically yield gain was obtained; the yield gains obtained in *Alex* (15,9%) and *Arieşan* (12,3%) are distingue significant and the yield gain obtained in *Ardeal* (7,1%) is significant, only;

• Regarding the 1000 grains weight only in Crişana was registered the positive difference significant statistically. Regarding the test weight, the difference in comparison with *Dropia* are insignificant difference statistically in *Crişana, Alex* and *Ardeal* and negative distingue significant in *Arieşan.*

• Wet gluten and dry gluten of the cultivars *Dropia, Crişana* and Arieşan had not the differences statistically assured. In comparison with *Dropia* cultivar, in *Alex* and *Ardeal,* very significant and distingue significant differences were registered.

• Falling number was improve very significant statistically in comparison with *Dropia* in *Crişana* (64,3%) and *Alex* (20,0%) but the values are included in the class with bad falling number, in *Arieşan* the difference is insignificant statistically and in *Ardeal* the difference is negative distingue significant.

• All 5 cultivars had very good values of the deformation index. The best value was obtained in *Alex* (4 mm) and *Crişana* (5 mm).

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