Foliar Fertilization Influence on Production Components Formation and Grains Quality for Triticosecale Witt.Variety

Ricuţa-Vasilica Dobrinoiu, Luminiţa Vişan, Silvana Dănăilă-Guidea, Andrei-Gabriel Ivan

Abstract - Triticale or triticosecale crop is a request of the present agriculture which resides in the exploitation of the less productive areas for wheat and maize, acid areas damaged by drought, by overwatering, poor in nutritive elements [3]. The main research direction is requested by the present and future necessity of the country to assure food safety. Global climate, energy and area crisis reveal, to the scientific society, especially to plants genetics and physiology, great difficulties in achieving new basic knowledge, applied by emphasizing, estimating and guiding of genetically - physiological mechanisms belonging to the plants ecologic resistance and production process, respectively, for our work, to triticale [4]. The work aimed at analysing the effect of foliar fertilization on triticale crop in different vegetation pheno stages on the indicators which convey the grains quality after harvest. The works were achieved on plots in randomized blocks for MEZIN triticale variety. We think that this topic represents a necessity for farmers in the present conditions of high global warming, with atmospheric and soil drought, found in area with low fertile fields, which triticale crop fully valorise them, by production gains, without an increased contribution of chemical fertilizers. Thus, one contributes to the lowering of the negative impact of chemical substances on the soil. The experimental data were statistically processed, by variance analysis, according to the settlement method in the field, according to plots, within randomized blocks [5].

Keywords - foliar fertilization, grains quality, triticosecale, vegetation pheno-stages

I. INTRODUCTION

Foliar application of water soluble fertilizers is already a known method of supplementation and nutrition enrichment plant. How nutrient uptake by leaves is considerably faster than the roots, foliar nutrition is extremely effective. Apply a balanced fertilizer in critical stages of growth will greatly benefit level and quality of agricultural production [1]. Foliar fertilizers tested in total soluble and total experience are being assimilated quickly and completely taken over by crop plants. Because they are compatible with the full range of approved pesticides may be applied with the solution used for weed, disease and pest specific crop, which is why foliar fertilization can be considered one of the most effective technological links in cereals by Autumn [2]. Perform such higher yields quantitatively and qualitatively in terms of increased economic efficiency in the context of protecting environment. Given the low doses that are recommended to be applied (5-15 kg/ a) and low cost (2 EUR/kg), we can say that foliar fertilization is available to everyone, regardless of method of administration used (foliar spray or with irrigation water), however under conditions of reduced inputs.

Manuscript Received on January 2015.

Ricuţa-Vasilica Dobrinoiu, University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, Mărăşti Bvd, no. 59, zip code 011464, Bucharest, Romania.

Luminiţa Vişan, University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, Mărăşti Bvd, no. 59, zip code 011464, Bucharest, Romania.

Silvana Dănăilă-Guidea, University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, Mărăşti Bvd, no. 59, zip code 011464, Bucharest, Romania.

Andrei-Gabriel Ivan, University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, Mărăşti Bvd, no. 59, zip code 011464, Bucharest, Romania.

II. MATERIAL AND RESEARCH METHOD

A. The experimental method carried on the field

In order to answer to the problem of autumn grains fertilization, grown on the dark-reddish preluvosoil, we organized a bifactorial experiment, the studied factors being the following:

The A FACTOR - foliar fertilizers used within experiments, with three grades:

a_1 – AGROFEED - 13-0-46;

a_2 – AGROFEED - 19-19-19 + 1% MgO + ME;

a_3 – AGROFEED - 11-0-0-16% MgO.

The B FACTOR – stage of foliar fertilizers application, with two grades:

b_1 – application in the union stage;

b_2 – application in the bladder stage;

Out of the two factors mixture, it resulted an experiment of the kind 3 x 2 = 6 variants and another (control) test variant. Each of the plots has the surface of 10 m^2 (L=10 m; l =1 m).

On the field, there were effected biometrical determinations, and before harvesting stage, there were taken crop samples in order to determine the productivity elements and to calculate the triticale production.

B. The experimental method carried out within the laboratory

In the seeds laboratory, out of the samples group taken from the field before harvest, we effected the following determinations:

a) ears number/m^2;
b) little ears number /ear;
c) grains number in the little ear;
d) grains number in the ear;
e) 1.000 grains mass (g);
f) hectolitrical mass (kg/hl);
g) moist gluten quantity (%);
h) protein quantity (%);
i) ashes quantity (%).

Depending upon the productivity elements (the

average number of ears, the average number of grains/ear and the mass of 1000 grains), we calculated the biological production of *MEZIN* triticale variety, according to the formula:

Q kg/ha = (Nsp x Nb x MMB) / 100

where:

Q kg/ha = the average production/ha expressed in kg;

- Their wash with 2% chlorine sodium solution, in order to determine the gluten quantity;- Decomposition of organic substances with natrium in sulphuric acid, in order to determine the protein content;

- Calcination at 600^0C in order to determine the ashes quantity. The experimental results were processed by variation method [5].

Nsp = the average number of ears /m^2;

Nb = the average number of the grains from one ear;

MMB = 1000 grains mass, expressed in grams.

Physical production determination, obtained from each plot was carried out by weighing operation. The lab determinations on gluten, protein and ash content were made by the following methods:

III. RESULT ANALYSIS

A. Foliar fertilization influence in different vegetation stages on ear number/m^2

The experimental results expressed after determining the number of fertile ears/m^2, on the basis of the mixed effect of foliar fertilization in different stages of triticale crop vegetation, are rendered as a synthesis in table 1

Table 1-Ears number /m^2 depending on the fertilization pattern

Var. exp.	*Foliar fertilizer*	*Stage of application*	*Ears/m^2*		*Diff.*	*Semnific.*
			NR.	*%*		
V_1	unfertilized (Mt.)		719,00	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	723,34	100,6	+4,33	***
V_3		b_2 – bladder stage	719,68	100,0	+0,67	-
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	726,00	101,0	+6,99	***
V_5		b_2 - bladder stage	720,33	100,2	+1,33	-
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	724,00	100,8	+5,00	***
V_7		b_2 - bladder stage	719,32	100,0	+0,33	-

$DL_{5\%}$ = 1,98; $DL_{1\%}$ = 2,78; $DL_{0,1\%}$ = 3,92

The highest number of harvestable ears/m^2 were recorded in the fertilized variant in the union stage with AGROFEED 19-19-19+1% Mg O + ME foliar fertilizer**,** these ones reaching the number of 726 ears/m^2.

We may assert that the balanced report between N:P:K and macro, micro-elements which make part of the formula of this foliar fertilizer had a direct impact on the formation of this productivity indicator for grains cereals.

Once with the analysis of the recorded data, one acknowledges that within all experimental variants, the harvestable ears number/m^2 was superior to the unfertilized control variant, the differences obtained reaching values comprised between 0,33 and 6,99 ears/m^2, with insignificant statistical insurance (-) for the fertilization in the bladder stage (V3, V5 and V7) and highly significant positive (***) when foliar fertilizers were administered in the union stage, no matter the tested foliar fertilizer within the experiment.

B. Foliar fertilization influence on little ears number in the ear within different vegetation stages

Concerning the number of little ears in the ear, one observes that this productivity indicator is superior to the unfertilized control variant, no matter the tested foliar fertilizer and its administration period.

Table 2.The number of little ears/ ear depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Little ears/ ear		Diff.	Semnific.
			no.	*%*		
V_1	unfertilized (Mt.)		14,43	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	15,12	104,8	+0,70	***
V_3		b_2 – bladder stage	14,83	102,6	+0,40	**
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	14,96	103,7	+0,53	***
V_5		b_2 - bladder stage	14,80	102,6	+0,36	**
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	14,97	103,7	+0,53	***
V_7		b_2 - bladder stage	14,87	103,0	+0,42	**

$DL_{5\%}$ = 0,23; $DL_{1\%}$ = 0,31; $DL_{0,1\%}$ = 0,46

The maximum number of little ears was achieved with the experimental variant where it was used AGROFEED 13-0-46 fertilizer in the union stage.

Thus, we may assert that the high content in K_2O favourably influenced the values of the productivity indicator for autumn grains.

C. Foliar fertilization influence on grains number/little ear within different vegetation stages

Foliar fertilizers influence, applied in different vegetation stages, on the number of grains in a little ear is shown in table 3.

Table 3.Grains number/ little ear depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Grains number/ little ear		Diff.	Semnific.
			no.	%		
V_1	unfertilized (Mt.)		1,44	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	1,48	103,5	+0,06	***
V_3		b_2 – bladder stage	1,50	104,2	+0,06	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	1,48	102,6	+0,04	***
V_5		b_2 - bladder stage	1,50	103,9	+0,06	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	1,47	102,3	+0,03	**
V_7		b_2 - bladder stage	1,49	103,5	+0,05	***

$DL_{5\%} = 0,02$; $DL_{1\%} = 0,02$; $DL_{0,1\%} = 0,03$

Out of the data presented in table 3, we observe that the foliar fertilizers used within the experiment, no matter the administration time led to the formation of a bigger number of grains in the little ear in comparison with the values recorded for the unfertilized control variant (1,44 grains/little ear).

The differences from the control variant were comprised between 0,03 and 0,06 grains/little ear, with highly significant statistical insurance (***) for all variants of foliar fertilization, except the experimental variant treated in the union stage with 11-0-0-16% Mg O fertilizer, where the difference from the control had a positive significant statistic insurance (**).

Thus, we may conclude that within the union pheno-stage of autumn grains, it is absolutely compulsory to administer nitrogen, phosphorous and potassium to plants, the absence of the latter two nutritive elements couldn't be replaced by the magnesium present in the chemical formula of this fertilizer.

D. Foliar fertilization influence on the number of grains/ear within different vegetation stages

The influence of foliar fertilization on the number of grains in one ear, for *MEZIN* variety, is rendered in table 4.

Analysing the grains number formed in one ear, we observe that the three foliar fertilizers stimulated significantly the values recorded by this indicator of productivity, towards the unfertilized control variant, no matter the pheno-stage where the treatments were achieved.

The differences from the unfertilized control variant were comprised between 1,00 and 1,33 grains/ear, with highly significant statistical insurance for every experimental variants. In terms of the number of grains formed in one ear, one observed the experimental variant where it was tested AGROFEED 13-0-64 fertilizer, administered in the union stage.

Table 4. Grains number in an ear depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Grains number / ear		Diff.	Semnific.
			no.	%		
V_1	unfertilized (Mt.)		21,00	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	22,33	106,3	+1,33	***
V_3		b_2 – bladder stage	22,00	104,8	+1,00	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	22,00	104,8	+1,00	***
V_5		b_2 - bladder stage	22,00	104,8	+1,00	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	22,00	104,8	+1,00	***
V_7		b_2 - bladder stage	22,00	104,8	+1,00	***

$DL_{5\%} = 0,39$; $DL_{1\%} = 0,54$; $DL_{0,1\%} = 0,77$

E. Foliar fertilization influence in different vegetation stages on the 1.000 grains mass (MMB)

The mixed influence of the two experimental factors on MMB is rendered in table 5. Tested foliar fertilizers within the experiment had a highly significant influence (***) over this parameter, no matter the time it was administered.

In comparison with the unfertilized control variant, there were recorded differences in the MMB values comprised between 1,58 and 3,44 g, within all experimental variants, the differences being statistically positive (***) no matter the used fertilizer on the time of its administration. Superior values were obtained when the fertilization was done during the bladder stage, such as: by fertilizing the crop with AGROFEED 13-0-46, the determined MMB was 3,29 g, after the fertilization with AGROFEED 19-19-19 + 1% Mg O, the value of this indicator was of 3,19 g, and by the treatment with AGROFEED 11-0-0-16 % Mg O, it was recorded the highest value of the productivity indicator, respectively 3,44 g. Thus, it is acknowledged that the magnesium present in the chemical formula of this fertilizer directly influenced the increase of the 1000 grains mass value, respectively the triticale crop quality. The experimental results obtained after determination of the 1000 grains mass emphasize the benefactor effect of foliar fertilization use, because these ones are rapidly and totally absorbed by the vegetative organs of the crop plants and put at their disposal. By their application in the bladder stage, the nutritive elements which make up the chemical formula of the fertilizers, the elements which are under ionic shape are immediately taken and directed towards production components formation.

Table 5. 1000 grains mass depending upon the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	1000 grains mass		Diff.	Semnific.
			(g)	*%*		
V_1	unfertilized (Mt.)		48,10	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	50,42	104,8	+2,34	***
V_3		b_2 – bladder stage	51,39	106,6	+3,29	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	49,68	103,3	+1,58	***
V_5		b_2 - bladder stage	51,30	106,5	+3,19	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	50,70	105,4	+2,61	***
V_7		b_2 - bladder stage	51,54	107,2	+3,44	***

$DL_{5\%} = 0,13$; $DL_{1\%} = 0,18$; $DL_{0,1\%} = 0,25$

F. Foliar fertilization influence in different vegetation stages on hectolitrical mass

The results obtained on the influence shown by the foliar fertilizers over the hectolitrical mass are rendered in table 6. The experimental data rendered in the table 6, show the positive impact the two tested factors had during the trial on the volume weight of triticale grains. Thus, one observes a significantly positive difference (***) of this physical indicator which render the seeds quality, difference recorded with all experimental variants which received tested foliar fertilizers administration, no matter the moment or the period of administration.

The recorded gains, in comparison with the unfertilized variant, were comprised between 0,87 kg/hl for the variant where it was used a foliar treatment in the union pheno-stage with AGROFEED 13-0-46 and 1,60 kg/hl, when administering in the bladder stage of the AGROFEED 19-19-19 + 1% MgO + ME fertilizer, variant where it was determined the highest value of hectolitrical weight as a consequence of the balanced report N:P:K by which this fertilizer is characterized.

Table 6. Hectolitrical mass depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Hectolitrical mass		Diff.	Semnific.
			(kg/hl)	*%*		
V_1	unfertilized (Mt.)		63,17	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	64,05	101,1	+0,87	***
V_3		b_2 – bladder stage	64,24	101,5	+1,06	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	64,48	101,8	+1,30	***
V_5		b_2 - bladder stage	64,48	102,1	+1,60	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	64,43	101,7	+1,25	***
V_7		b_2 - bladder stage	64,66	102,0	+1,48	***

$DL_{5\%} = 0,07$; $DL_{1\%} = 0,10$; $DL_{0,1\%} = 0,15$

G. Foliar fertilization influence in different vegetation stages on biological production

Foliar fertilizers influence on *Gorun* variety biological production is rendered in table 7. The biological production increased significantly for all experimental variants after the administration of the foliar fertilizers tested within the experiment. The recorded differences, compared to the control variant which didn't receive the fertilizers contribution were comprised between 841 kg/ha for the fertilized variant in the union stage with AGROFEED 19-19-19+1% Mg O + ME and 1294,33 kg/ha when the fertilization was achieved with AGROFEED 13-0-46, administered in the same vegetation pheno-stage. The most insignificant production gains were recorded after the administration of fertilizers in the bladder pheno-stage, no matter the tested fertilizer. The results were obtained equally due to the water from the nutritive solutions prepared for foliar watering, the water which however annihilated the drought effect from the period of grains forming and filling.

Table 7. Biological production depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Biological production		Diff.	Semnific.
			(kg/ha)	*%*		
V_1	unfertilized (Mt.)		7.118,00	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	8.412,33	118,2	+1.294,33	***
V_3		b_2 – bladder stage	8.211,31	115,4	+1.093,33	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	7.959,00	111,7	+841,00	***
V_5		b_2 - bladder stage	8.157,00	114,6	+1.039,00	***

V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	8.080,00	113,5	+962,00	***
V_7		b_2 - bladder stage	8.169,33	114,8	+1.051,33	***

$DL_{5\%}$ = 325,67; $DL_{1\%}$ = 457,17; $DL_{0,1\%}$ = 645,39

H. The influence of foliar fertilization in different vegetation stages on physical production

The data achieved after physical production determination, as a mixed effect of the two studied factors are rendered in table 8.

The physical production obtained after harvesting a triticale crop recorded high significant gains (***) for all the experimental variants, fertilized in different pheno-stages, compared to unfertilized control variant.

Table 8. The physical production depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Physical production		Diff.	Semnific.
			(kg/ha)	*%*		
V_1	unfertilized (Mt.)		5398,00	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	5704,63	105,5	+306,66	***
V_3		b_2 – bladder stage	5931,66	109,9	+533,67	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	5605,65	103,7	+207,66	***
V_5		b_2 - bladder stage	5805,00	107,5	407,00	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	5998,33	111,1	600,33	***
V_7		b_2 - bladder stage	6169,00	114,3	771,00	***

$DL_{5\%}$ = 30,09; $DL_{1\%}$ = 42,22; $DL_{0,1\%}$ = 59,62

The production gains were comprised between 207,66 and 600,33 kg/ha, when the fertilizers were administered in the union stage, while, by the administration in the bladder pheno-stage, one emphasizes the physical production increase phenomenon, the production gains were comprised between 407 and 771 kg/ha, the best fertilization pattern proving to be the one where nutritive elements administration was achieved in the bladder stage by using AGROFEED 11-0-0-16% Mg O fertilizer.

Mg O present in the chemical formula of this fertilizer elongated the photo-synthetic stage of triticale foliar mechanism, ensuring this way, ideal conditions for forming and filling grains.

I. Foliar fertilization influence in different vegetation stages on the content of moist gluten

The results achieved after determining the content in moist gluten of triticale grains, under the influence of the crop foliar fertilization stages are rendered in table 9.

Thus, we may observe that the highest content in moist gluten was recorded in experimental variants where each of the analysed foliar fertilizer were administered in the bladder pheno-stage. All foliar fertilizers determined a favourable, significant influence on moist gluten content, signalling an increase comprised 1,00 and 6,06 percentual points, in comparison with the control unfertilized variant. The content in moist gluten varied largely from one pattern to another, the highest values of this indicator for the bakery quality, being recorded by means of the administration in the bladder pheno-stage of AGROFEED 13-0-46 fertilizer, where the percentual value of the moist gluten content was of 42,55%.

Table 9. Moist gluten content depending on the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Moist gluten content		Diff.	Semnific.
			%	*%*		
V_1	unfertilized (Mt.)		36,48	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	40,87	112,0	+4,36	***
V_3		b_2 – bladder stage	42,55	116,6	+6,06	***
V_4	a_2 AGROFEED 19-19-19+1%MgO+ME	b_1 - union stage	37,49	102,7	+1,00	***
V_5		b_2 - bladder stage	38,41	105,3	+1,92	***
V_6	a_3 AGROFEED 11-0-0-16%MgO	b_1 - union stage	39,51	108,3	+3,02	***
V_7		b_2 - bladder stage	40,86	112,0	+4,38	***

$DL_{5\%}$ = 0,04; $DL_{1\%}$ = 0,06; $DL_{0,1\%}$ = 0,08

J. Foliar fertilization influence in different vegetation stages on the proteic substances content

The content in proteic substances of *triticale* grains was favourably influenced after administering nutritive elements by foliar watering with tested fertilizers within the experiment, for all experimental fertilized variants, significant positive differences being recorded (***) in comparison with the unfertilized control variant.

Table 10. The protein content depending upon the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Protein content		Diff.	Semnific.
			%	*%*		
V_1	unfertilized (Mt.)		15,55	100,0	0,00	Mt.
V_2	a_1 AGROFEED 13-0-46	b_1 – union stage	16,98	109,2	+1,43	***
V_3		b_2 – bladder stage	17,51	112,6	+1,96	***

V_4	a_2	b_1 - union stage	15,73	101,1	+0,18	***
V_5	AGROFEED 19-19-19+1%MgO+ME	b_2 - bladder stage	16,19	104,1	+0,64	***
V_6	a_3	b_1 - union stage	16,25	104,5	+0,70	***
V_7	AGROFEED 11-0-0-16%MgO	b_2 - bladder stage	16,72	107,5	+1,17	***

$DL_{5\%} = 0,08$; $DL_{1\%} = 0,12$; $DL_{0,1\%} = 0,17$

Thus, we notice an increase of the protein content comprised between 0,18% for the fertilized variant in the union stage with AGROFEED 19-19-19 + 1% MgO + ME and 1,96% for the variant where the fertilization was achieved in the bladder stage AGROFEED 13-0-46 product, variant which is strictly superior to other experimental variants under the aspect of the proteic substances comprised in the triticale grains. No matter the administered foliar fertilizer, one acknowledges that the highest values of this indicator, for the baking quality in autumn grains, were achieved when the main nutritive elements administration, necessary to the forming and filling of grains, was done in the bladder pheno - stage which is considered to be one of the critical pheno-stages for the nutritive elements.

K. Foliar fertilization influence in different vegetation stages on the ashes content

In table 11 are synthesized the experimental results obtained concerning the ashes content determination in triticale grains, as a consequence of crop foliar fertilization influence in different vegetation pheno-stages.

Analysing the results recorded consequently this determination, we notice that the values of this indicator increase significantly (***), in comparison with the unfertilised control variant, within all experimental variants, no matter the used fertilization pattern, except the variant where foliar fertilization was achieved in the union pheno-stage, using AGROFEED 19-19-19 + 1% Mg O + ME fertilizer, variant where it was recorded a significant increase of the ashes content (*).

The highest values of this indicator were obtained in the experimental variants where tested foliar fertilizers administration within the experiment was achieved in the bladder pheno-stage, the maximum value being recorded with the experimental variant, where it was administered AGROFEED 13-0-46 fertilizer.

The recorded differences, in comparison with the untreated control variant were comprised between 0,01 and 0,09 percentual points within the union pheno-stage fertilization and 0,07 – 0,24 percentual points after administrating fertilizers in the bladder pheno-stage, for the latter case, all the recorded values have very significant statistical insurance (***), compared to the control variant.

Table 11. The ashes content depending upon the fertilization pattern

Var. exp.	Foliar fertilizer	Stage of application	Ashes content		Diff.	Semnific.
			%	%		
V_1	unfertilized (Mt.)		0,50	100,0	0,00	Mt.
V_2	a_1	b_1 – union stage	0,59	118,1	+0,09	***
V_3	AGROFEED 13-0-46	b_2 – bladder stage	0,74	148,3	+0,24	***
V_4	a_2	b_1 - union stage	0,51	102,7	0,01	*
V_5	AGROFEED 19-19-19+1%MgO+ME	b_2 - bladder stage	0,56	113,4	+0,07	***
V_6	a_3	b_1 - union stage	0,56	113,4	+0,07	***
V_7	AGROFEED 11-0-0-16%MgO	b_2 - bladder stage	0,58	116,1	+0,08	***

$DL_{5\%} = 0,01$; $DL_{1\%} = 0,02$; $DL_{0,1\%} = 0,02$

IV. CONCLUSIONS

The highest number of harvestable ears/m^2 was recorded for the fertilized variant in the union stage with the foliar fertilizer AGROFEED 19-19-19+1%MgO+ME, reaching the value of 726 ears/m^2.

The maximum number of little ears was achieved in the experimental variant where it was administered the AGROFEED 13-0-46 fertilizer during the union stage.

Thus, we may assert that due to the high content in K_2O, we remarked a favourable influence of this indicator on the autumn grains productivity.

All foliar fertilizers used within the experiment, no matter the administration time, determined, the formation of a big number of grains in the little ear in comparison with the values recorded for the unfertilized control variant (1,44 grains/little ear).

Analysing the grains number formed in one ear, we observe that the three foliar fertilizers stimulated significantly the values recorded by this productivity indicator, in comparison with the unfertilized control variant, no matter the pheno stage where the treatments were achieved.

In comparison with the unfertilised control variant, there were recorded MMB values differences comprised between 1,58 and 3,44 g, in every experimental variant the differences having statistical positive insurance (***) no matter the used foliar fertilizer or the administration time.

The biological production increased significantly within all experimental variants, with the administration of the fertilizers tested within the experiment, the lowest production gains being recorded after foliar fertilizers administration in the bladder pheno-stage, no matter the tested fertilizer.

In comparison with the untreated control sample, the three foliar fertilizers influenced favourably the physical production, the highest level of production being recorded after administering in the bladder pheno-stage of AGROFEED 11-0-0-16% MgO foliar fertilizer which

ensured a production of 6169 kg/ha.

The gains recorded after volume weight determination for triticale grains, compared to the unfertilized control sample, were comprised between 0,87 kg/hl for the variant where it was applied a foliar treatment in the union pheno-stage with AGROFEED 13-0-46 and 1,60 kg/hl for the administration of AGROFEED 19-19-19+1% MgO + ME fertilizer, variant where it was determined the highest value of hectolitric weight as a consequence of balanced report effect N:P:K, by which we characterize this fertilizer.

The content in moist gluten varied in broad limits from one fertilization pattern to another, the highest values of bakery quality indicator being recorded by the administration in the bladder pheno-stage of AGROFEED 13-0-46 fertilizer, variant where the percentual value of the content in moist gluten was of 42,55%.

The content in protein substances of triticale grains influenced favourably the production after the administration of nutritive elements by foliar watering with fertilizers tested within the experiment, (***) compared to the control unfertilized variant.

REFERENCES

1. R.V. Dobrinoiu, M. Dumbrava, 2003 - Impact of foliar fertilization with completely soluble chemical fertilizers on winter wheat productivity and yields quality, Lucrări ştiinţifice, U.S.A.M.V.B., vol. XLVI, p. 271-277.
2. R.V. Dobrinoiu, M. Dumbrava, 2005 - Rates of biomass accumulation in the autumn wheat under different fertilizing conditions, Lucrări ştiinţifice, U.S.A.M.V.B., vol. XLVIII, p. 286-293.
3. Gh. Ittu, N.N. Săulescu, M. Ittu, P. Mustăţea, 2005 - Realizări şi perspective în ameliorarea speciei triticale în România. Lucrări ştiinţifice U.S.A.M.V.B. XLV;
4. Gh. Ittu, N.N. Săulescu, M. Ittu, P. Mustăţea, 2006 - Rezistenţa la încolţirea în spic a germoplasmei româneşti de triticale (xTriticosecale Wittmack), Probl. Genet. Teor. Aplic. XXXVIII(1-2), 31-47;
5. N. Saulescu, 1959 - Câmpul de experienţă. Ed. Agro-Silvică de Stat, Bucureşti, p. 223-228.

AUTHOR PROFILE

Ricuta-Vasilica DOBRINOIU, Ph.D. (43 years old) is an engineer licensed in the field of agriculture since 1995 (with Diploma of Agricultural Engineer obtained at the USAMV Bucharest, in profile specializing - Agriculture). In prezent is an asst. Professor at the University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, 18 years old (since 1997) with activities in education in Agricultural and Horticulture Biotechnology and Experimental techniques field.

Luminita VISAN, Ph.D. (49 years old) is an engineer licensed in the field of Horticulture since 1987 (with Diploma of Horticulture Engineer obtained at the USAMV Bucharest, in profile specializing - Horticulture). In prezent is an Lecturer Senior at the University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, 16 years old, with activities in Horticulture and Fermentative Biotechnology field.

Dr. Silvana GUIDEA DANAILA (45 years old) is an engineer licensed in the field of horticulture since 1993 (with Diploma of Agricultural Engineer obtained at the USAMV Bucharest, in profile specializing -Horticulture).In prezent is an associate professor at the University of Agriculture and Veterinary Medicine Bucharest, Faculty of Biotechnology, 14 years old with activities in education in Agricultural and Horticulture Biotechnology field by multiplying plants by biotechnological methods (in vitro culture) to improve plant conventional crops and vegetable species of flower species, plant biodiversity conservation, viticulture and pomiculture.

Andrei-Gabriel IVAN (21 years old) Student at the University of Agriculture and Veterinary Medicine Bucharest, Faculty of Agriculture