RESEARCH REGARDING THE INFLUENCE OF THE NPK FERTILIZATION TO THE CULTURAL HYGIENE AT THE WINTER WHEAT CULTIVATED IN THE CARACAL PLAIN

CERCETĂRI PRIVIND INFLUENȚA FERTILIZĂRII CU NPK ASUPRA IGIENEI CULTURALE LA GRÂUL DE TOAMNĂ CULTIVAT ÎN CÂMPIA CARACALULUI

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Abstract: *The winter wheat is the most important culture crop for the European area related to the multiple utilizations of the seed production. To increase the yields obtained at this culture, the farmers must take all the integrated measures to protect the culture. The well-balanced fertilization with NPK levels ensures a good capacity of the plants to fight against the weeds and diseases and near the measure of herbicide application conduct to a good cultural hygiene at the wheat culture.*

Rezumat: *Grâul de toamnă este cea mai importantă cultură pentru zona europeană ținând cont de multiplele utilizări ale producției de semințe obținute. Pentru a obține producții ridicate la cultura grâului trebuie luate masuri de combatere integrată a bolilor şi dăunătorilor pentru protejarea culturilor. O fertilizare echilibrată a culturii asigură o capacitate bună a plantelor pentru dezvoltare şi îi conferă posibilitatea de a lupta mai bine cu buruienile şi bolile, iar alături de aplicarea erbicidelor şi tratamentelor foliare contra bolilor asigură o bună igienă culturală.*

***Key words*:** *nitrogen, phosphorus, potassium, diseases*
***Cuvinte cheie*:** *azot, fosfor, potasiu, boli*

INTRODUCTION

Ensuring a good cultural hygiene is one of the most important measures to create the favourable conditions for plants development and to obtain high and qualitative yields at the winter wheat culture crop. The foliar diseases can cause important damages or can compromise the entire culture when we do not use the integrated fighting system against them.

MATERIALS AND METHODS

The experience was carried out at the Caracal Agricultural Research Station situated in the Central area of the Caracal plain. The experiment has three factors:

- **A factor** was represented by the phosphorus level,
- **B factor** was represented by the potassium levels and
- **C factor** was represented by the different nitrogen levels.

The previous culture was soybean. The plough-land was done at the 20 cm depth and the seedtime was 12th of October. As variety, we use the Flamura 85 cultivar at the standard density of 500 seed/m^2. As standard we used the unfertilized variant and the collected data were processed using the variance analysis.

RESULTS AND DISCUSSIONS

The climatic conditions for the experimented years (2007) was not favourable to the occurrence and evolution of the diseases at the wheat culture. As it can be observed in table no.

1, the general values for temperature on the period of vegetation of wheat were higher, then the average/60 years overtaking in January with +8.9°C. On the entire period from October to May the registered temperature was higher then the average with +4.1°C, the year being considered as warmer than the average.

From the point of view of precipitations large deficits were registered in the first period of vegetation (October to January) and in the last month we found low values of precipitations (April to May). These climatic conditions (a dry and warm year) have made that the productions obtained to be smaller than the ones which is usually obtained in the central area of Caracal plain.

Table 1

SPECIFICATION		MONTH								
		OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APR.	MAY	**AVERAGE TOTAL**
Temp. (°C)	Month average	13.1	7.5	2.1	5.9	4.9	9.0	14.1	21.3	**9.7**
	Average/60 years	11.3	4.9	- 0.5	- 3.0	- 0.6	4.8	11.2	16.6	5.6
DIFFERENCE		**+ 1.8**	**+ 2.6**	**+ 2.6**	**+ 8.9**	**+ 5.5**	**+ 4.2**	**+ 2.9**	**+ 4.7**	**+ 4.1**
Ppt. (mm)	Total	33.8	11.8	33.6	19.2	33.6	50.8	-	46.3	229.1
	Ppt. > 5 mm	22.2	-	26.2	13.2	22.6	31.2	-	37.6	153.0
	Average/60 years	40.4	40.3	39.4	33.3	30.4	34.9	43.6	64.9	327.2
DIFFERENCE		**- 6.6**	**- 28.5**	**- 5.8**	**- 14.1**	**+ 3.2**	**+ 15.9**	**- 43.6**	**- 18.6**	**- 98.1**

From the early spring to the maturity of the plants were find with low intensity the follow diseases: *Erysiphe graminis* and *Septoria tritici* and only from time to time we observed *Pyrenophora teres*.

The analysis of the pickling rate of the registered diseases put into light the very significant effect of the mineral fertilisation with nitrogen, phosphorus and potassium (table no. 2). The determinations to establish what kinds of diseases were present into the culture crop were done in two stages: at the end of twined time and at the time of bloom. Were made observations regarding the frequency, intensity and pickling rate of the diseases.

Erysiphe graminis – has appear at the end of twined time stage and was located only at the first leave scabbard's without extended on superior parts of the leaves. The disease was registered with a high pickling rate at the variants with higher levels of phosphorus, potassium and nitrogen related to the unfertilized variants. A higher pickling rate at the fertilized variants was registered because of favorable microclimate realized by the growing and development of the plants.

The evolution of the disease whit low level of attack at the unfertilized variants was owed to the fact that the plants from these variants haven't twined and they have a sluggish grown. In these conditions, the plants haven't a developed foliar system and the microclimate wasn't favorable to the apparition of the Erysiphe graminis.

The lack of precipitations and the higher temperature from this year were conduct to stopping the development of the plants and created the conditions that made as the disease do not advance on the superior leaves.

From the analysis of the applied fertilizers we find out that the increase of the pickling rate increase together with the levels of the applied fertilizers. All the doses of macro elements applied to the wheat crop determinate an increase of the pickling rate at the medium levels of

fertilizers and decrease to the higher levels applied (tables' no. 3 and 4). That situation was explained by the climatically conditions from this year.

Table 2.

The influence of the phosphorus to the pickling rate of foliar diseases at the winter wheat culture in 2007

Phosphorus (P_2O_5)	DISEASES								
	Erysiphe graminis			Septoria tritici					
	End of twined time			End of twined time			In bloom		
	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %
P 0	15.1	2.52	0.38	77.5	1.59	1.23	65.4	2.6	1.70
P 40	56.2	2.38	1.34^{xxx}	47.3	1.20	0.57^{000}	59.9	2.72	1.63^{0}
P 80	72.3	3.20	2.31^{xxx}	35.0	1.34	0.47^{000}	62.0	2.92	1.81^{xx}
P 120	52.0	4.15	2.16^{xxx}	32.5	1.51	0.49^{000}	61.3	2.17	1.33^{000}
DL 5%		0.05			0.05			0.06	
DL 1%		0.08			0.08			0.09	
DL0.1%		0.12			0.13			0.14	

Table 3

The influence of the potassium to the pickling rate of foliar diseases at the winter wheat culture in 2007

Potassium (K_2O)	DISEASES								
	Erysiphe graminis			Septoria tritici					
	End of twined time			End of twined time			In bloom		
	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %
K_0	32.5	3.1	1.01	39.5	2.4	0.95	62.0	2.77	1.72
K_{40}	40.7	4.69	1.91^{xxx}	23.0	2.43	0.56^{000}	63.7	2.78	1.77^{x}
K_{80}	45.0	3.71	1.67^{xxx}	22.0	2.55	0.56^{000}	60.1	2.28	1.37^{000}
DL 5%		0.09			0.03			0.04	
DL 1%		0.12			0.04			0.06	
DL0.1%		0.17			0.06			0.08	

Septoria tritici – has appear in culture at the ending of the twined time and was registered only the base of the leaves.

The pickling rate was higher at the level of the unfertilized variants where the plants were less developed that the ones of the fertilized variants. The attack of this pathogen and the climatically conditions, especially the lack of rain, were conducted by the sear of the first leaves of the plants.

The disease has advanced at the wheat culture even in the in bloom stage of plants development, but at the low pickling rate also. In this stage at the variants with high levels of phosphorus and potassium the pickling rate decrease in the same time with the increase of the applied levels.

In case of the applied nitrogen, the situation is different and the observed effect of the increase levels conduct to increase also the pickling rate of the disease.

In the percentage of pickling rate, one of the most important factors was the frequency of the attack, which was higher related the intensity of the disease attack, which has very low values (tables 3 and 4).

Table 4

The influence of the nitrogen to the pickling rate of foliar diseases at the winter wheat culture in 2007

Nitrogen (N)	DISEASES								
	Erysiphe graminis			Septoria tritici					
	End of twined time			End of twined time			In bloom		
	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %	Frequency	Intensity	Pickling rate %
N 0	15.8	2.97	0.47	41.6	2.30	0.96	60.0	2.4	1.44
N 50	42.5	1.79	0.76^{xxx}	31.7	2.15	0.68^{000}	64.9	2.3	1.49^{xx}
N 100	41.7	2.88	1.20^{xxx}	25.4	2.67	0.70^{000}	69.0	2.29	1.58^{xxx}
N 150	60.8	3.67	2.23^{xxx}	28.3	2.23	0.63^{000}	74.5	2.28	1.70^{xxx}
N 200	78.0	3.92	3.06^{xxx}	23.8	2.02	0.48^{000}	75.4	2.51	1.89^{xxx}
DL 5%			0.16			0.04			0.04
DL 1%			0.21			0.06			0.05
DL0.1%			0.28			0.08			0.06

The level of the intensity of the disease attack was maintained at the low values because of the climatically conditions and especially by the lack of the precipitations and high values of the temperature which conduct to stop the evolutions of the diseases.

The mineral fertilisations levels with phosphorus, potassium and nitrogen applied at the winter wheat cultivated in central area of the Caracal plain were definitive influenced the apparition and development of the pathogens.

Pyrenophora teres – was registered in culture only from time to time and was located at the superior leaves level only. The desultory apparition of this pathogen wasn't influenced by the level of the mineral fertilization, for this year she was influenced only by the climatically conditions.

CONCLUSIONS

By the presented data we can say that:

The experimented year – 2007 – was warmer and dryer that the average/60 years and were influenced the apparitions and development of the pathogens;

Erysiphe graminis – was observed in culture at the end of the twined time stage of plant development and has a high pickling rate at level of phosphorus of P_{80} an moderate level of potassium of $K_{40;}$

On the levels with nitrogen, the pickling rate of the Erysiphe graminis has registered an increase together with the level of fertilization, the highest value being observed at the N_{200} variant;

Septoria tritici - has appear in culture at the ending of the twined time, but the highest rate was observed at the in bloom stage when at the levels of N_{200} was registered the high pickling rate;

Pyrenophora teres – was registered in culture only from time to time and wasn't influenced by the level of the mineral fertilization.

LITERATURE

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