

## THE EFFECT OF FOLIAR FUNGICIDE TREATMENTS ON THE WHEAT YIELD AND QUALITY

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**Abstract.** *The paper studied the effects of foliar fungicide treatments on the wheat yield and qualitative traits. The trials were set up at ARDS- Turda, during two years. Besides agrotechnique measures such as: crop rotation, sowing time, balanced fertilization, utilization of resistant cultivars, chemical measure are very important, being also, the most effective diseases control. Foliar fungicide treatments assured substantially significant yield gains were really improved the quality in term baking due to gluten content. Applying two treatments with fungicides determined an evident increase reach up to 30,7 % of the wet gluten and to 11,7% of the protein content, respectively yield gains were varied between 14,0-20,1%, average being 16,4 %, in the two experimental ears.*

**Key words:** wheat diseases, fungicide treatments, protein and gluten content

### INTRODUCTION

Wheat crops are damaged by numerous diseases which caused quantitative and especially qualitative yield losses in Transylvania conditions. The complex of foliar diseases : powdery mildew (*Blumeria graminis* f. sp. *tritici*), leaf and glume blotch (*Septoria tritici* and *Stagonospora nodorum*), rusts (*Puccinia striiformis*, *Puccinia recondita* and *Puccinia graminis*) and tan spot (*Pyrenophora tritici – repentis*) as well as head blight (*Fusarium* spp.) and ears blackening (*Alternaria* and *Cladosporium*) are the most frequently in wheat crops. Yield losses reaching to 30% from yield value depend on climatic conditions and wheat cultivar.

### MATERIAL AND METHOD

The effect of fungicide foliar treatments and winter wheat was studied at ARDS Turda during two ears. It was organized twofactorial trials after block split type with 3 treatments variants: untreated (T<sub>0</sub>), 1 Treatment ( T<sub>1</sub>) applied at through early flag leaf emergence (ZGS38) and 2 treatments (T<sub>2</sub>) applied through early flag leaf emergence (ZGS38) and in the end of flowering (ZGS73). The fungicides used contain: spyroxamine 250 g/l+tebuconazole 167g/l+triadimenole 43g/l at dose 0,6 l/ha, for the first treatment, respectively prothioconazole 125g/l+ tebuconazole 125g/l at dose 0,9 l/ha for the second treatment. In the field, attack degree for main diseases (%) and yield (kg/ha) and in the laboratory, baking parameters protein and wet gluten content (%) were determined. It also evaluated, thousand kernels weight (TKW ), volumetric weight and percentage of diseased kernels.

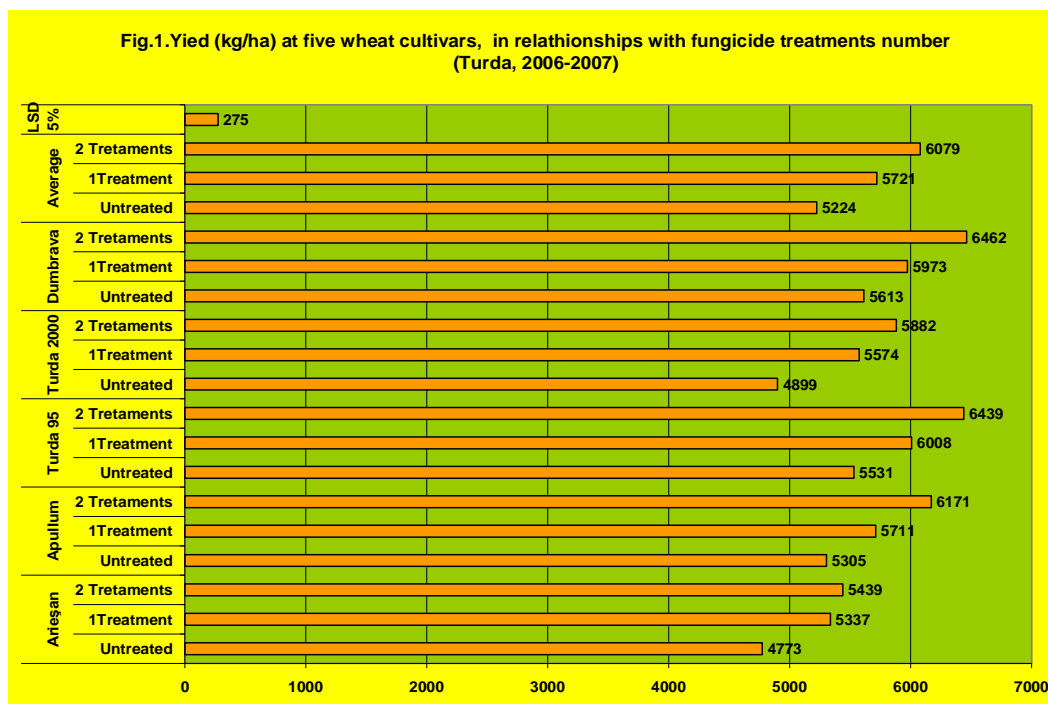
## RESULTS AND DISCUSSION

The weather conditions from April, May, June months of 2 years is characterized by high temperature associated with weather deficit, were not very favorable of the diseases occurrence, it know that is essentially weather- dependent. Foliar diseases: powdery mildew, tan spot, leaf blotch and brown rust and ears diseases: *Fusarium* head blight (FHB) were presented in wheat crops. By applying of one single fungicide treatment, attacked leaf area by foliar diseases was significantly reduced in average with 50% and quite more at Turda 2000 and Apullum cultivars. Applying of 2 treatments diminished substantially diseased leaf area (3,8%) and the FHB attack (2,6%), with positively effect on the yield capacity.(Tab.1).

Applying one foliar treatment increases yield with 5,4-13,8 %, average being 9,5% and for two treatments with 14,0-20,1%, average being 16,4 %, in the two ears. For Turda 95 and Dumbrava wheat cultivars, the highest yield by 6436 kg/ha respectively 6462 were registered.(Fig 1.) Between spikes and diseased kernels a positive and significant correlation exists, defined by equation:  $y=1,0447x+5,7327$ ;  $R^2 = 0,6268^*$ .(Fig.2.)

Besides substantially significant yield gains were really improved the quality in term baking due to gluten content. Applying two treatments with fungicides determined an evident increase reach up to 30,7 % of the wet gluten and to 11,7% of the protein content (Fig.3).

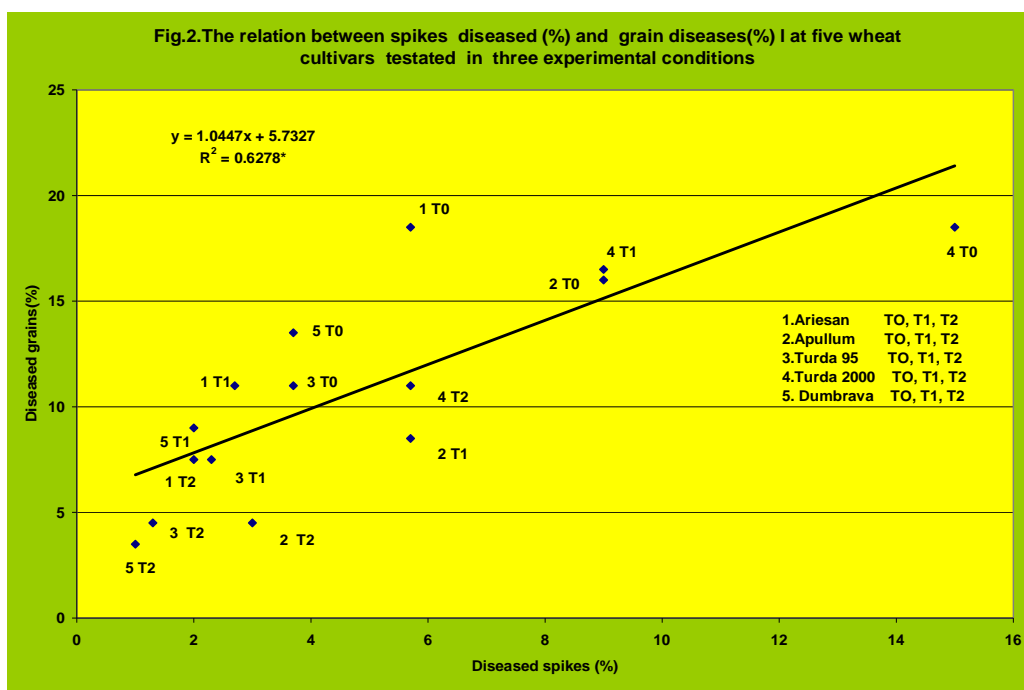
Tested fungicides were presented a good efficacy in controlling of foliar and ear disease, remarked Soprano (0,75l/ha), Tango Super(1.0l/ha), Artea (0,4l/ha), Caramba(1,0l/ha), Amistar Extra (0,5l/ha), Falcon (0,7l/ha), Nativo 0,8 (l/ha), Prosoar (0,9l/ha).

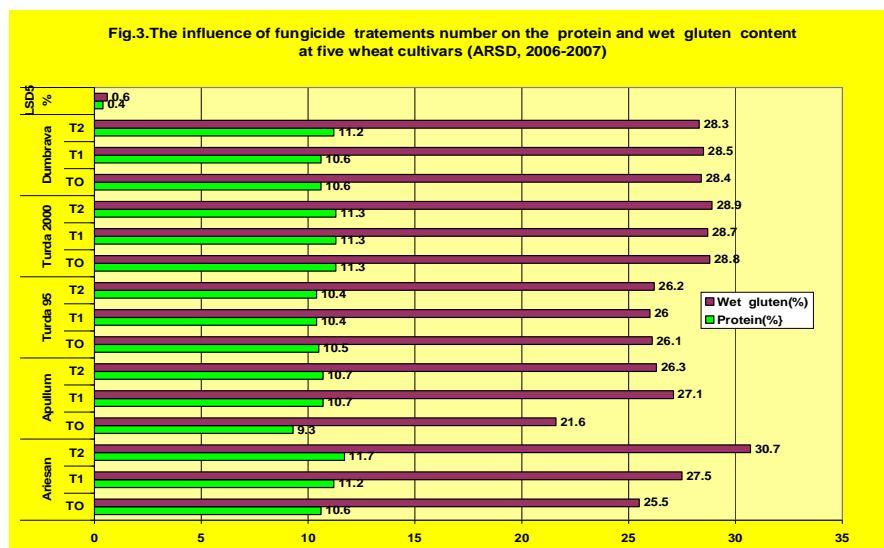


**Tabel 1.**

**The interaction years x fungicide treatments number on the Fusarium head blight and yield at 5 wheat cultivars**

Years	Cultivars	Untreated			1 treatment			2 treatments					
		Disea sed ears	Kg/ha	Yield Rel.	s	Disea sed ears	Kg/h a	Yield Rel.	s	Disea sed ears	Kg/h a	Yield Rel.	s
2006	Arieșan	4,3	3265	100	Mt.	3,3	4059	124	***	1,3	4086	125	***
	Apullum	5,0	3503	100	Mt.	3,3	3807	109	-	2,0	4462	127	***
	Turda 95	4,3	3971	100	Mt.	2,3	4558	115	**	1,7	4794	121	***
	Turda 2000	11,3	3297	100	Mt.	9,3	3968	120	**	3,7	3968	120	**
	Dumbrava	4,0	3882	100	Mt.	3,3	4022	104	-	1,7	4387	108	*
	Average	5,8	3584	100	Mt.	4,3	4083	114	***	2,1	4340	121	***
2007	Arieșan	5,7	6282	100	Mt.	2,7	6616	105	-	2,0	6793	108	*
	Apullum	9,0	7107	100	Mt.	5,7	7616	107	*	3,0	7879	111	***
	Turda 95	3,7	7091	100	Mt.	2,3	7459	105	-	1,3	8084	114	***
	Turda 2000	15,0	6500	100	Mt.	9,7	7180	110	**	5,7	7796	120	***
	Dumbrava	3,7	7342	100	Mt.	2,0	7925	108	**	1,0	8537	116	***
	Average	7,4	6864	100	Mt.	4,5	7359	107	***	2,6	7818	114	***
LSD	Years x treatments									1,1	222		
5%	Treatments x years x cultivars									1,8	388		





## CONCLUSIONS

1.The fungicide treatments on the vegetation assured the expressed biological potential of wheat cultivars, the yield and qualitative gains were significant.

2.Application of single foliar treatment at flag leaf emergence, determined yield gains between 5,4-13,8%, average being 9,5%, comparing the untreated variant. By application of two treatment, the 1<sup>th</sup> (T 1), when flag leaf emergence and the 2<sup>nd</sup> (T2), in the end of flowering, the saved yields increases with 14,0-20,1 %, average being 16,4%, the values statistically assured.

3. The Apullum and Turda 2000 cultivars presented the highest gains rich up 20,1%.The highest wet gluten content increase was by 25,2%, for Apullum and Ariesan cultivars increase with 20,2% due to application of fungicide treatments.

4. The fact that in years with moderate infection pressure, it obtained significant yield gains associated with substantially quality improvements by increase in protein content (5,7-15,7%), and wet gluten compared with untreated variant, it could be the results of prolongation of resting green leaves and also of filing of the grains. Realizing of wheat performed and quality yield could not possible without a corresponding protection against foliar and ear diseases in humide and semi-humide area, like Transilvania-Romania.

## REFERENCES

1. Jarroudi, M.El, Tychon, B., Maraite, H., Hoffmann, L. 2004.Epidemiological importance on the tan spot on winter wheat crop in the Grand Duch of Luxemburg. VIII ESA Congress, Copenhagen (Denmark), 11-14, july, 2004, Book of Proccedings, p. 87-88.
2. Jergensen, L.N., Secher Bo., J. M., Nielsen, G. C. 1996. Monitoring diseases of winter wheat on both a field and a national level in Denmark.Crop Protection vol.15, Issue 4,june: 383-390.
3. Osborne, L.E., Stein, J,M. 2007. Epidemiology of Fusarium head blight on small-grain cereals. International Journal of Food Microbiology vol. 119, Issue 1-2, 20 October:103-108.