ASSESSMENTS CONCERNING DYNAMICS DATA OF THE MAIN FOLIAR PATHOGENS OF WHEAT UNDER THE CLIMATIC CHANGES FROM THE LAST YEARS.

Adrian BORCEAN, Levente MOLNAR, Simona NIȚĂ

Banat's University of Agricultural Sciences and Veterinary Medicine, Faculty of Agricultural Sciences, Timisoara, Aradului Street, no. 119, RO-300645, Romania,
Corresponding author: adrian_borcean@yahoo.com

Abstract: *Research aim of the present paper is to present the dynamic of main foliar diseases of wheat caused by the fungus Erysiphe graminis and Septoria tritici. The biologic material consist from an assortment of three of the most used wheat cultivars from the area. Technology used in the experimental field was the standard applied for this location. The experience was implemented on the soil and climatic conditions from Didactic Station. Last three years bring a very significant change of the main climatic factors (temperature and rain water) with a direct influence in dynamic of majority of diseases caused by fungus and bacteria. Taking all this in consideration we are revealing in the present paper the behavior of three from the most important cultivars from the Western Plain at the attack of both funguses under the last three years climatic changes. The experience was calculated after normal statistic method for bifactorial experiences, with first factor the cultivar and the second factor the observation year. The achievements bring by the present work consist from the first author experience in research of the wheat diseases and also the possible reactions of the pathogen relating to local biocoenosis factors. Limits of the research are that data refer strictly to the relation between cultivars and pathogens. Practical implications of the research are that all data presented in the present paper are a part of a complex study of wheat diseases protection strategy. This strategz is important for the both funguses, Erysiphe graminis and Septoria tritici because they can be considered as endemic disesas for wheat in the Western Plain of Romania. The originality of the work comes from the fact that data are relevant in view of cultivars behaviour under specific conditions. The relevant data, experimental results give an overview of pathogen behavior in relation to experimental conditions.*

Key words*: foliar pathogens, Erisiphe graminis, Septoria tritici, wheat*

INTRODUCTION.

Wheat, as one of the most important crops from the Western Plain of Romania was the target of a large numbers of studies during time wich refer at the influence of both factors, technology and climatic on wheat(1,2,3,4,5,6,7). The main foliar diseases present in the last three years (2007-2009) have a large variation mostly due to climatic changes. This was the motivation for the present paper in which are presented the results after bonitation of frequency and intensity of attack for fungus *Erysiphe graminis* and *Septoria tritici*.

MATERIAL AND METHOD.

The experimental field was placed at Didactic Station of University of Agricultural Sciences and Veterinary Medicine of Banat County from Timisoara and it was organized after the method of two factors.

First factor was the experimental years with four graduations: 2007, 2008, 2009 and the average of experimental cycle which was considerd witness for this factor. The second factor was the variety with seven graduations: Kristina, Romulus, Alex, Ciprian, Arieșan, Lovrin34 and the average of the varieties which was considered the witness for this factor.

RESULTS AND DISCUSSIONS

Firs observations which could be done at the evolution of fungus *Erysiphe graminis* attack, is the constant apparition of this fungus, even under dryness condition from the year 2007, when powdery mildew appear since the end of April due to water from rains from the end of March and beginning of April. Beginning with May, powdery mildew disappear completely from the field.

From experimental cycle 2007-2009(table 1), the highest frequency of powdery mildew was recorded in the year 2008, statistic ensure as distinct significantly. As it was expected, the lowest average of attack frequency was in the year 2000, statistic ensure as distinct significantly negative. Comparing with the other two years, in 2002 the difference to experimental cycle was under significance level. Powdery mildew intensity of attack has almost the same shape as frequency of attack, the highest level from experimental cycle was in the year 2008 and the lowest in the year 2007.

The varieties behaviour at powdery mildew attack over the experimental cycle was very dissimilar and it was capital influenced by the features gained in the breading process and the age of this varieties. From this point of view, it is clear and demonstrated by the statistic results, that the most sensible varieties was the oldest Lovrin 34 and Arieşan because this varieties lose their resistance and tolerance proprieties because of the evolution of pathogens agresivity. Thus the attack frequency has a very significant difference for Lovrin 34, and a distinct significantly difference for Arieşan. Romulus variety has a frequency average close to the witness and with no statistic significance. The lowest frequency of attack was obtained at varieties Alex, Ciprian with significantly negative difference and Krystina with a very significant negative difference to witness. Intensity of attack (table 2), have a similar evolution as frequency of attack, the most sensible varieties remain Lovrin 34, Arieşan which have a distinct significant difference.

Table 1.

The dynamic of fungus *Erysiphe graminis* frequency between 2000 and 2002

Factor A Year	Factor B - Variety						Averages of factor A	Difference	**Signif**
	Kristina	Romulus	Alex	Ciprian	Arieşan	Lovrin34			
2007	6.6	5	6.6	5	10	10	7.2	-9.5	00
2008	15	28.3	18.3	18.3	33.3	56.6	28.3	11.6	**
2009	10	10	11.6	13.3	18.3	20	13.9	-2.8	-
Average of years	10.5	13.9	12.2	12.2	20.5	28.9	16.7	Witness	-

DL 5%=5.0 DL 1%=7.6 DL 0.1%=12.1

Factor B - Variety	Kristina	Romulus	Alex	Ciprian	Arieşan	Lovrin34	***Average of varieties***
Averages of factor B	10,5	14.4	12.2	12.2	20.5	28.9	16.3
Difference	-5,8	-1.9	-4.1	-4.1	4.2	12.6	Witness
Significance	000	-	0	0	**	***	-

DL 5%=3.1 DL 1%=4.2 DL 0.1%=5.5

Table 2.

The dynamic of fungus *Erysiphe graminis* intensity between 2000 and 2002

Factor A Year	Factor B - Variety						Averages of factor A	Difference	**Signif**
	Kristina	Romulus	Alex	Ciprian	Arieşan	Lovrin34			
2007	1	3.3	5	2.3	5	6.6	3.9	-3.3	00
2008	6.6	13.3	6.6	8.3	13.3	13.3	10.2	3	**
2009	5	8.3	5	6.6	11.3	10	7.7	0.5	-
Average of years	4.2	8.3	5.6	5	10	10	7.2	Witness	-

DL 5%=1.9 DL 1%=2.9 DL 0.1%=4.7

Factor B - Variety	*Kristina*	Romulus	Alex	*Ciprian*	*Arieşan*	Lovrin34	***Average of varieties***
Averages of factor B	4.2	8.3	5.5	5.7	9.9	10	7.3
Difference	3.1	1	1.8	1.6	2.6	2.7	Witness
Significance	000	-	0	0	**	**	-

DL 5%=1.6 DL 1%= 2.2 DL 0.1%= 2.8

Table 3.

The dynamic of fungus *Septoria tritici* frequency between 2000 and 2002

Factor A Year	Factor B - Variety						Averages of factor A	Difference	Signif
	Lovrin34	Romulus	Alex	Ciprian	Arieşan	Kristina			
2007	6.6	5.3	3	5	8.3	6.6	5.8	-8.1	ooo
2008	36.7	16.7	11.7	13.3	35	16.7	21.7	7.8	***
2009	30	11.7	8.3	11.7	18.3	10	15	1.1	-
Average of years	24.4	11.2	7.6	9.8	20.4	10.4	13.9	Witness	-

DL 5%=1.8 DL 1%= 2.8 DL 0.1%= 4.5

Factor B - Variety	Lovrin34	Romulus	Alex	Ciprian	Arieşan	Kristina	Average of varieties
Averages of factor B	25	15	7.7	10	20.5	11.1	14.2
Difference	10.8	0.8	-6.5	-4.2	6.3	-3.1	Witness
Signif	***	-	000	00	***	-	-

DL 5%=3.4 DL 1%= 4.6 DL 0.1%= 6.0

Table 4.

The dynamic of fungus *Septoria tritici* intensity between 2000 and 2002

Factor A Year	Factor B - Variety						Averages of factor A	Difference	Signif
	Lovrin34	Romulus	Alex	Ciprian	Arieşan	Kristina			
2007	3.7	1	2.3	1	5	3.7	2.8	-3.6	00
2008	16.7	10	3.7	5	13.3	11.7	10.1	3.7	***
2009	11.7	6.7	3.7	6.7	6.7	3.7	6.5	0.1	-
Average of years	10.7	5. 9	3.2	4.2	8.3	6.3	6.4	Witness	-

DL 5%= 2.1 DL 1%=3.2 DL 0.1%=5.1

Factor B - Variety	Lovrin34	Romulus	Alex	Ciprian	Arieşan	Kristina	Average of varieties
Averages of factor B	10.7	5.9	3.2	4.2	8.3	6.4	6
Difference	4.7	-0.1	-2.8	-1.8	2.3	0.4	Witness
Signif	***	-	00	-	*	-	-

DL 5%=2.0 DL 1%= 2.7 DL 0.1%= 3.5

In the same time the varieties Alex and Dropia show a relative tolerance to powdery mildew with a statistic insurance of significant negative difference reported to witness..

The best behavior from analyzed varieties was Krystina which has the lowest intensity of attack, with a statistic insurance of very significant negative difference reported to witness. All this are indicating a good tolerance of Partizanka to powdery mildew

The second analyzed pathogen over the experimental cycle was *Septoria tritici* (tables 3 and 4). The same as *Erysiphe graminis, Septoria tritici* could be considered as endemic because it appears constantly in wheat fields from Western Plain of Romania every year. The dynamic of the fungus offer very good information of the varieties sensitiveness in a certain geographic area.

Referring to the tested varieties, the most sensible proof to be Lovrin 34 and Arieşan because the average of attack intensity was very significant. The best variety from our experience was Alex because the attack frequency was at a very significant negative difference and the attack intensity was at a distinct significant negative difference.

From the other varieties, Romulus and Ciprian shown a relative sensitivity because the averages of attack frequency and intensity was under the significance limit. Comparing with this, Dropia show a very instable behavior because if the frequency of attack has a distinct significant negative difference, the intensity of attack was under the significance limit.

CONCLUSIONS

1. *Erysiphe graminis* and *Septoria tritici* are andemic diseases for wheat in the Western Plain of Romania, because they appear every year, even if climatic conditions for this two pathogens are not so favorable.

2. Under climatic conditions of 2007- 2009 experimental cycle the most favorable year for both pathogens was in 2008 and the most unfavorable conditions was in the year 2007.

3. The most sensitive varieties at *Erysiphe graminis* over the experimental cycle prove to be Lovrin 34 and Arieşan, and the most tolerant was Alex, Krystina and Ciprian.

4. Regarding to *Septoria tritici,* the most sensitive was varieties Lovrin 34 and Arieşan and a good tolerance was shown only by Alex.

BIBLIOGRAPHY

1. BORCEAN A. BORCEAN I., DAVID GH., Condiționarea, păstrarea şi protecţia produselor agricole vegetale, Ed. Eurobit, Timişoara, 1999.
2. DOCEA E., SEVERIN V. Ghid pentru recunoaşterea şi combaterea bolilor plantelor agricole, Ed. Ceres, Bucureşti, 1990.
3. POPESCU GH., Fitopatologie, Ed. Mirton, Timişoara, 1999.