STUDY CONCERNING THE BEHAVIOR OF THE FUNGUS *HELMINTHOSPORIUM TURCICUM* DURING 2009-2011 IN THE CLIMATE OF BOZOVICI

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Abstracts: *The goal of the present paper is to present the dynamic of main foliar diseases of corn caused by the fungus Helminthosporium turcicum. The biologic material consists from an assortment of six corn hybrids. In the experimental field the technology used was the standard technology applied for this location area. The experience was implemented on the meadow soil and climatic conditions from Almajului Valley, near the town of Bozovici. 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 try to reveal in the present paper the behavior of six from the most cultivated Dekalb corn hybrids from the western part of Romania, at the fungus Helminthosporium turcicum attack under the last three years climatic changes. The experience results were calculated after normal statistic method for experiences with three factors, where the first factor is the experimental year, the second factor was the hybrid and the third factor the nitrogen amount. The achievements bring by the present work consist from the authors experience in research of the corn diseases under climatic change and in technological conditions of intensive agriculture. Also it is interesting from the point of view of possible reactions of the pathogen relating to local biocoenosis factors. Limits of the research are that data refer strictly to the relation between hybrid, nitrogen amount and fungus Helminthosporium turcicum. Practical implications of the research are that all data presented in the present paper are a part of a complex study of corn diseases protection strategy. This strategy is important for the fungus Helminthosporium turcicum because it can be considered as endemic disease for corn in the western part of Romania. The originality of the work comes from the fact that data are relevant in view of corn hybrids behavior under specific conditions. The relevant data, experimental results give an overview of pathogen behavior in relation to experimental conditions.*

Key words: *corn, Helminthosporium turcicum, climate change, nitrogen amount*

INTRODUCTION

Between July and August of the years 2009, 2010 and 2011 there was carried out a number of observations in the maize experimental of field crops from Almajului Valley. It was very interesting to see the differences between hybrids to the attack of fungus *Helminthosporium turcicum* and, the fact that it may be interesting as information's for other researchers and farmers is the reason of the present paper with experimental results.

MATERIAL AND METHODS

Experimental field was placed in Almajului Valley in a plot near the town Bozovici. The field was organized after the method with three experimental factors as follows: the experimental year, nitrogen amount and the maize hybrid. To analyze the behavior of the fungus we collect the climatic data from Bozovici Meteorological Station.

Regarding to the experience and to the statistic calculation, the first experimental factor was the experimental years with three graduations: 2009, 2010, and 2011 and the average of experimental cycle which was considered witness for this factor. The second factor

was the hybrid with six graduations: DKC 3511 DKC 4626 DKC 4964 DKC 4983 DKC 5170 DKC 5183. The third factor was the nitrogen amount with three graduations 100 kg/ha, 150 kg/ha and 200 kg/ha.

RESULTS AND DISCUSSIONS

As it show the figures 1 and 2, the climatic conditions from the period between 2009 - 2011 have notable differences between years. As it shown in both 1 and 2 graphics, along the vegetation period, between July and August, the most favorable conditions for the pathogen were in the year 2010. This is because of the amount of water from rainfall which has the highest amount in June and August 2010, practically in the month with high rate of northern leaf blight (*Helminthosporium turcicum*).

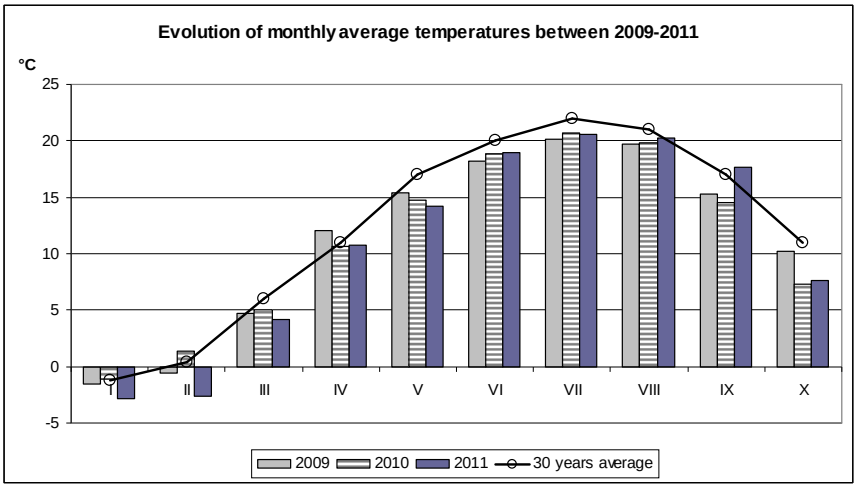

Figure 1. Temperature evolution between 2009 - 2011 reported to multiannual averages

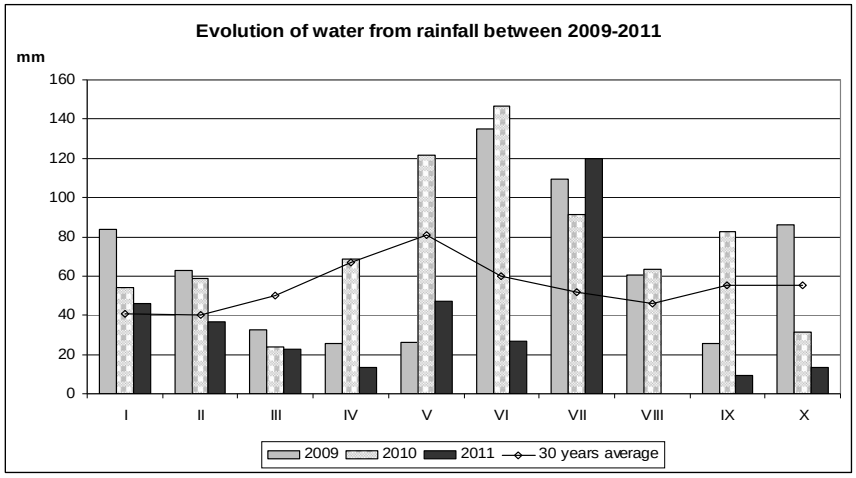

Figure 2. Rain water evolution between 2009 - 2011 reported to multiannual averages

From the beginning we can say that after seven years of observation and taking in consideration the evolution of attack parameters (frequency and intensity) it is obvious that fungus *Helminthosporium turcicum* appear every year as it can be easily seen from the table 1 where are reproduced the fungus averages of attack degree. But the attack severity of this fungus is directly influenced by the climatic parameters. Even under dryness condition from the year 2011, when northern leaf blight prove a high recovery potential because it bring the average of attack parameters at a level between years 2009 and 2011(table 1), only based on August rainfall water amount. Looking at the figures from the statistic analyze, it show very clear that the most favorable year for pathogen was 2010 when attack degree registered a distinctly significant difference to control. Also it is obvious from table 1, that the lowest values of attack degree was registered in the year 2009 when the average was situated at a significant negative difference to control.

Table 1.

The dynamic of fungus *Helminthosporium turcicum* attack degree between 2009 and 2011 and differences between hybrids and tested nitrogen levels registered on Bozovici experimental field

Factor A Year	Factor B Hibrid	Factor C Nitrogen amount			Factor A averages	Difference	Signific.
		N_{100} P_{80} K_{80}	N_{150} P_{80} K_{80}	N_{200} P_{80} K_{80}			
2009	DKC 3511	2,25	3,17	4,25	1,67	-0,26	0
	DKC 4626	0,58	1,17	3,08			
	DKC 4964	0,50	1,42	2,33			
	DKC 4983	0,58	1,42	2,67			
	DKC 5170	0,13	0,58	1,67			
	DKC 5183	0,25	1,25	2,75			
2010	DKC 3511	0,75	1,67	3,25	2,25	0,32	**
	DKC 4626	0,67	1,08	4,00			
	DKC 4964	0,58	1,25	3,17			
	DKC 4983	0,83	2,92	5,75			
	DKC 5170	1,08	1,67	3,33			
	DKC 5183	0,58	2,58	5,42			
2011	DKC 3511	0,92	1,75	3,17	1,88	-0,06	-
	DKC 4626	1,00	1,83	5,25			
	DKC 4964	0,42	1,17	3,00			
	DKC 4983	0,67	1,92	4,83			
	DKC 5170	0,27	0,67	1,67			
	DKC 5183	0,42	1,58	3,25			
Average	DKC 3511	1,31	2,19	3,56	1,93	Control	-
	DKC 4626	0,75	1,36	4,11			
	DKC 4964	0,50	1,28	2,83			
	DKC 4983	0,69	2,08	4,42			
	DKC 5170	0,49	0,97	2,22			
	DKC 5183	0,42	1,81	3,81			

DL 5%=0,16 DL 1%=0,28 DL 0.1%=0,77

Factor B	Factor B averages	Differences	Signific.
DKC 3511	2,35	0,03	-
DKC 4626	2,07	-0,25	0
DKC 4964	1,54	-0,78	00
DKC 4983	2,40	0,08	-
DKC 5170	1,23	-1,09	00
DKC 5183	2,01	-0,31	0
Average	2,32	Control	-

DL 5%= 0,24 DL 1%=0,66 DL 0.1%= 1,47

Factor C	N_{100} P_{80} K_{80}	N_{150} P_{80} K_{80}	N_{200} P_{80} K_{80}
Averages of factor C	0,69	1,62	3,49
Differences	Control	0,92	2,80
Signif.	-	-	**

DL 5%= 1,4 DL 1%=2,7 DL 0.1%= 4,1

Referring to the tested hybrids, the best tolerance to northern leaf blight was registered at DKC 4964 and DKC 5170 with a distinctly significant negative difference to control. This hybrid was followed at a short distance by DKC 4626 and DKC 5183. Also, the most sensitive hybrids were DKC 3511 and DKC 5183 which registered a difference to control situated bellow significance threshold.

The nitrogen amount draw again a very sensitive relation between pathogen *Helminthosporium turcicum* and corn plants. As it show the results from table 1 it is clear that and increase in the nitrogen level is followed by an increase of plants sensitivity, at the highest nitrogen dosage, the attack degree parameters increase to a distinct significant difference on the trial with 200 kg/ha nitrogen.

CONCLUSIONS

1. The behavior of fungus *Helminthosporium turcicum* is very strong influenced by the rainfall water amount, the highest levels of the attack parameters(frequency and intensity) over the experimental factors was registered in the year 2009 when there was the highest amount of water from rainfall between beginning of July and the end of August.

2. From tested hybrids, the best behaviour was at hybrids DKC 4964 and DKC 5170 with a good tolerance reaction to fungus *Helminthosporium turcicum* infectious pressure between 2009 and 2011.

3. The analyze of fungus attack reported to the hybrids precocity group show that there is no correlation between this two factors because in the same time, over all three years and the tested nitrogen amounts, hybrids from different precocity groups show the same sensitivity to northern leaf blight.

4. Increasing the nitrogen amount, without correlation to phosphorus and potassium amount is a bad technological decision because this conduct to a directly correlated increase of corn plants exposure in the front of pathogen infectious pressure.

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