MONITORING THE ATTACK OF SEPTORIA TRITICI ROB. ET DESM. IN TIMIS COUNTY IN 2020

L.MOLNAR, Ioana GROZEA, Ramona ŞTEF, Ana-Maria VÎRTEIU, Snejana DAMIANOV, A. F.CĂRĂBEŢ

„Banat University of Agricultural Sciences and Veterinary Medicine "Regele Mihai I al Romaniei " from Timisoara, Romania,
Corresponding author:leventemolnar@usab-tm.ro

Abstract: *The year 2020, from the climatic point of view, was an unusual year, due to the fact that spring and the beginning of summer were was much colder, with much lower temperatures than the multiannual averages, inspired us to make observations on some diseases frequently found in Timiş County. Thus, we made observations on the fungus Septoria tritici Rob et Desm., which under normal conditions in Romania is a secondary disease that occurs in colder years, and in dry years is almost completely absent. Normally the septoria blotch does not end up infecting the gonfalon leaf (F) in any year, but this year due to low temperatures this fungus also reached the gonfalon leaf. In 2020 we studied the attack of Septoria tritici Rob et Desm., In six localities in Timiş County, in the wheat beech ripening phase, phenophase also delayed due to low temperatures, wheat accumulating more difficult this year the sum of temperatures necessary for its development.The localities studied were Beba veche, Murani, Bethausen, Poieni, Ştiuca, Clopodia and Foieni. The frequency (F%), the intensity (I%) and the frequency of attack of the fungus on the gonfalon leaf (F) and on the third leaf below the gonfalon (F-1) were assessed, the results were analyzed. statistically and analyzed as such.*

Key words: *Autumn wheat, Septoria tritici, Septoria tritici blotch of wheat, Timiş county*

INTRODUCTION

Septoria blotch is generally a very damaging disease for cereals. GHIORGHIEŞ C. (1972), records important production losses produced by *Septoria tritici* and *Septoria nodorum*, losses that amounted to 25% or even more of the total wheat production.

The Finn PELTONEN J. (1993) states that at a 37% infection of spring wheat with Septoria nodorum, the production decreases by about 33%, videlicet in the case of his experience the losses were 1393 kg/ha.

EYAL, 1981, BABADOOST and HERBERT, 1984, POLLEY and THOMAS, 1991 (cited by GILCHRIST L. and DUBIN, 2001) state that *Septoria trtici* causes significant crop losses (31 - 53%). In the world over 50 million ha of wheat are affected by the fungus, of which the largest affected areas are found in regions with massive rainfall.

COMES I., (1982) in Romania, archive damages of 10 - 15% caused by Septoria trtici and Septoria nodorum.

POPESCU GH., (1998), estimates that the attack of the fungus reduces the production by 45% - when the spike is attacked, by 33% - when the gonfalon leaf is attacked and by 10% - when 30% of the foliage is attacked, and if the plant is attacked totally, the crop losses reach 55%.

According to WEBER (1922), KOBELL (1922), HOPP (1957), BLOCK (1959), sectoral fungi, especially in favorable weather, can cause damage of 50% and even more.

WATKINS J.E., (1984 and 1996) (quoted by MOLNAR, 2004), says that 2% of the world's wheat crop losses are due to septoria blotch.

FONES HELEN & all. (2015) reports financial damage caused by STB in the European Union between 250 million and 750 million euros depending on the country.

WEBER, (1922), "in vitro" establishes the temperatures between which the fungus

shows activity, this interval being 6 - 32°C. Determines that the range of optimal development values is 20 - 24°C. LUTHRA (1937) after its determinations establishes values approximately equal to those determined by WEBER. ARSENIJEVIĆ (1965) observed fungal growths between 3 - 5°C, at a very low rate, and fruiting took place after a very long time. The same author states that at temperatures exceeding 32°C, the fungus forms only chlamydospores.

WEBER finds that the germination of spores can take place at extreme temperatures at 2 - 3 ° C, but also between 33 - 34 ° C.

Research conducted in the United States by LIPPS P.E. and MILLS D., in 2002 showed that *Septoria tritici* fungus shows maximum aggression at temperatures between 68 - 81ºF (15 - 20ºC).

The dependence of the evolution of Septoria tritici attack regarding to climatic conditions is given according to mathematical models by THOMAS M et all in 2019.

MATERIAL AND METHODS

In view of the observations, seven localities were chosen, scattered as homogeneously as possible on the surface of the entire territory of Timiș County and in such a way as to include plains, hills and mountains. The localities were as follows; Beba veche, Murani, Bethausen, Poieni, Știuca, Clopodia, and Foieni.

In each location three relatively homogeneous wheat fields were chosen and in each field the frequency (F%) and intensity (I%) of the septoria blotch attack on an area of five square meters were determined, using the metric frame on the large diagonal of to each field. Under laboratory conditions we calculated the degree of attack (Ga%) and the limit differences were calculated statistically.

RESULTS AND DISCUSSION

Data on the degree of attack (Ga%) on the leaf F-3, of the *Septoria tritici* fungus in the seven localities, compared to the average of the experience are presented in table 1 and in figure 1.

Table 1.

The degree of attack (G%) of the fungus on the leaves F-3

Nr. crt.	Locslities	Repetitions			Average	Relative diff. (%)	Diff.	Significance
		R1	R2	R3				
1	Beba veche	28.48	28.63	34.57	30.56	74.06	-10.71	000
2	Murani	34.13	35.83	28.41	32.79	79.46	-8.47	00
3	Bethausen	46.87	44.41	47.34	46.21	111.97	4.94	0
4	Poieni	57.06	62.26	54.97	58.10	140.78	16.83	000
5	Știuca	41.63	48.65	43.73	44.67	108.24	3.40	-
6	Clopodia	34.41	36.02	35.63	35.35	85.67	-5.91	0
7	Foieni	39.54	42.08	41.95	41.19	99.81	-0.08	-
8	Average	40.31	42.56	40.94	41.27	100.00	0.00	Mt.

DL5% - 4.693; DL1% - 6.3087; DL0.1% - 9.0374.

From the table above, it can be seen that the degree of septoria blotch attack in the conditions of 2020 was very low compared to the years with normal thermal regime.

In Poieni, due to the low temperatures and frequent dew conditions in the high areas, the degree of attack was the highest. The high degree of attack from Beba veche can be

explained by both the low temperatures and the rich hydrography of the area. In the other localities the degrees of attack were fluctuating, but with not too big differences.

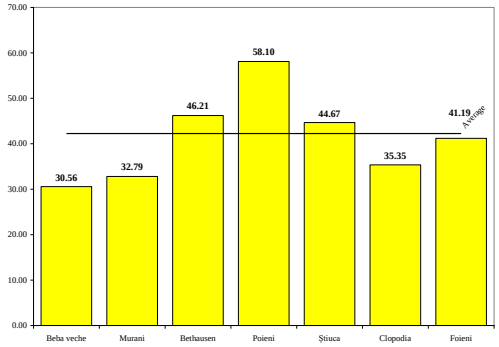

Figure 1. The degree of attack (G%) of the fungus on the leaves F-3

In Table 2 and Figure 2 shows the degree of attack 2020, the fungus *Septoria tritici* gonfalon leaf under 2020 year.

Table 2.

Degree of attack (Ga%) of the fungus on the gonfalon leaf

Nr. crt.	Locslities	Repetitions			Average	Relative diff. (%)	Diff.	Significance
		R1	R2	R3				
1	Beba veche	12.35	11.20	9.67	11.07	116.07	1.53	-
2	Murani	7.28	6.96	7.94	7.39	77.50	-2.15	-
3	Bethausen	11.26	9.45	.8.53	10.36	108.54	0.81	-
4	Poieni	14.50	13.87	15.25	14.54	152.40	5.00	**
5	Ştiuca	9.96	8.84	9.22	9.34	97.90	-0.20	-
6	Clopodia	8.25	7.65	6.24	7.38	77.36	-2.16	-
7	Foieni	6.67	8.21	6.45	7.11	74.53	-2.43	-
8	Average	10.04	9.45	9.13	9.54	100.00	0.00	Mt.

DL5% - 3.7931; DL1% - 5.0986; DL0.1% - 7.3040.

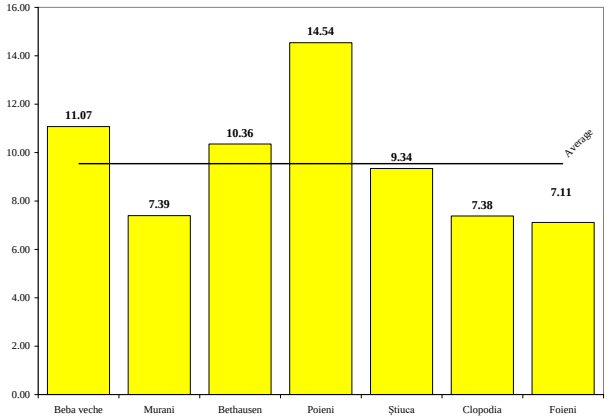

Figure 2. Degree of attack (Ga%) of the fungus on the gonfalon leaf

Analyzing the graph and the table above you can see that seproria was present on the gonfalon leaf in all localities taken in the studio, but in Poieni the degree of attack of 14.54%

was the highest, both due to lower temperatures. Dew in this area gives the fungus good conditions for development and spread due to its frequency and persistence on plants.

In the other localities, the fungus attack was consistent, but from a statistical point of view, the differences from the control were insignificant.

CONCLUSIONS

Due to the low temperatures, the fungus was massively present on the wheat from all the localities studied.

This year the infection was also present on the gonfalon leaf, which appears very rarely in the plain areas of Timiș County.

Due to the high area with lower temperatures since the beginning of summer in Poieni, as well as the presence and persistence of dewdrops, the attack was high.

Low temperatures accompanied by high humidity positively influence the growth, development and spread of Septoria tritici.

BIBLIOGRAPHY

BABADOOST, M. şi HERBERT, T.T. 1984. Factors affecting infection of wheat seedlings by Septoria nodorum. Phytopathology, 74: 592-595.

COMES I., LAZĂR AL., BOBEȘ I., HATMAN, M., DRĂCEA ANETA ELENA, 1982, Fitopatologie, Ed. Did. şi Ped., Bucureşti

EYAL, Z.E., 1981. Integrated control of Septoria diseases of wheat. Plant Dis., 65: 763-768.

FONES HELEN, GURR SARAH, 2015, The impact of Septoria tritici Blotch disease on wheat: An EU perspective, Fungal Genetics and Biology Volume 79, June 2015, Pages 3-7

GHEORGHIEȘ, C., 1972, Contribuţii la studiul biologiei şi combateri ciupercii Septoria tritici, Teză de dizertaţie, Inst. agron. "N. Bălascu', Bucureşti.

GILCHRIST L., DUBIN H.J., 2001, Septoria diseases of wheat, FAO Corporate Document Repository, http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/006/Y401

HOPP H., 1957, Untersuchungen uber die Braunfleckigkeit des Weizens und ihren Erreger Septoria nodorum Berk., Phytopath. Zeitschr., 29,4.

LIPPS E.P., MILLS D., 2002, Septoria tritici Blotch and Stagnospora nodorum Blotch, Extension Fact Sheet, The Ohio State University Extension

MOLNAR L. 2004, Efectele strobilurinelor asupra ciupercii Septoria tritici Rob. et. Desm. – pHd thesis

PELTONEN J., 1993, Partitioning of injuries causet by winter, fungal diseases and infections in cereals. Agricultural - Science - in - Finland. 1993, 2: 4, 353-356;8 ref.

POLLEY, R.W. & THOMAS, M.R. 1991. Surveys of disease of wheat in England and Wales, 1976-1988. Ann. Appl. Biol., 119: 1-20.

POPESCU GH., 1998, Fitopatologie, Vol. II, Ed. Mirton, Timişoara

THOMAS M. CHALONER, HELEN N. FONES, VARUN VARMA, DANIEL P. BEBBER, SARAH J. GURR, 2019 – A new mechanistic model of weather-dependent Septoria tritici blotch disease risk - Published:06 May 2019https://doi.org/10.1098/rstb.2018.0266

WATKINS J.E., 1984, Septoria Leaf Blotch of Wheat, Extension Plant Pathologist, File G701 under: Plant Diseases, C-20, Field Crops, Issued Aprilie, University of Nebraska-Lincoln

WEBER G. F., 1922-1923, Septoria diseases of cereals, Phytopathology, 12-13