RESEARCH ON THE BEHAVIOR OF SOME WINTER WHEAT CULTIVARS AT THE ATTACK OF PATHOGENS UNDER NATURAL INFECTION CONDITION, IN THE NORTH-EAST AREA OF MOLDOVA

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Abstract

Wheat crop are damaged by numerous pathogens which cause diseases which produce quantitative and qualitative yield losses under Moldovian area pedoclimatic conditions. It is well know that wheat is one of the most important crop for world agriculture and the continuous diversification of the wheat range varieties can be an effective measure for increasing and stabilizing wheat production. This paper presents the research results concerning the behavior of 32 Romanian winter wheat cultivars, based on the data obtained during 2015-2017, performing at Didactic Station Iasi - Ezăreni Farm. The research was designed according to the randomized block method in three replications, containing 25 variants; every variant was represented by one of the winter wheat cultivars. The control variant of the experience was the Bezostaia 1 wheat variety. The winter wheat varieties under study exhibited a wide variability over the studied factors. During the study period, the pathogens present in the winter wheat crop were represented by *Blumeria graminis* f.sp. *tritici* (DC) Speer., *Septoria tritici* Rob. et Desm. and *Puccinia recondita* f.sp. *tritici* Rob. et Desm. The degree of attack (DA%) of pathogens were determined with frequency (F%) and intensity (I%) of attack.

Key words: winter wheat varieties, pathogen agents, foliar diseases, climatic conditions, yield.

Wheat crop (*Triticum aestivum* L.) have a particular importance for world agriculture – being the most widely grown and consumed food grain – and especially for Romanian agriculture – having an important role for stability of economy and people's food requirement. Wheat is one of the most important food crops; each year, wheat is cultivated on more than 200 million hectares globally with more de 600 million tons grain produced. This means that wheat provides every year approximatively 15-16% of total dietary calories consumed worldwide (Dixon *et al*., 2009).

The cultivar is an essential factor in wheat crop technology and the continuous diversification of the wheat range varieties can be one of the most effective measures for increasing and stabilizing wheat production (Pochișcanu Simona-Florina *et al*., *2011*).

Choosing the best wheat variety for growing cannot guarantee very good yields, but choosing an inappropriate wheat variety can make investments made in wheat crops not being capitalized at full capacity (Mustățea *et al.*, *2003*).

This paper aims to analyze the behavior of 32 winter wheat varieties in the period 2015-2017, in terms of adaptability to the conditions of natural infection with different pathogens.

MATERIALS AND METHODS

Between October 2015 and July 2017, the behavior of 32 winter wheat cultivars was observed.

The winter wheat cultivars were represented by romanian varieties (from N.A.R.D.I. Fundulea: 11368G1, 11424G1, 11838G8, Boema, Glosa, Izvor, Litera, Miranda FDL, Otilia, Pajura, Pitar, Semnal, Unitar, Ursita, Vestitor, Voevod, Voinic, respectively from A.R.D.S. Turda: Andrada, Codru, Dumbrava, T.19-10, T.42-05, T.55-01, T.62-01, T.95-12, T.109-12, T.118-11, T.123-11, T.124-11, T.143-11, T.150-11), as well by the old Russian variety Bezostaia 1, used as a long-term control variant in comparative crops (Morgounov A. *et al., 2012)*.

The experience was placed in the experimental field of the Iasi Didactic Station, the "Ezăreni" farm being organized according to the randomized block diagram, in three replicates, each wheat cultivar representing an experimental variant.

In the experience, the specific technology of wheat cultivation was applied; no treatments against pathogens were performed.

The total area of the experience was 715 m^2, comprising a total of 75 variants with a surface area of 7.7 m^2. On this surface, eight rows of wheat were sowed at a distance of 12.5 between them.

The observations to identify the presence of pathogens were conducted between March-June 2016 and March-June 2017.

In order to determine Frequency (F%), Intensity (I%) and to calculate the degree of attack

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(DA%), were made observation with metric frame (50X50 cm) in each variant of the 3 replications, on the pathogens identified in winter wheat crop: *Blumeria graminis* f.sp. *tritici* (DC) Speer., *Septoria tritici* Rob. et Desm. and *Puccinia recondita* f.sp. *tritici* Rob. et Desm. To determine the Intensity of attack (I%) was use the F.A.O. scale rate, with 9 attack classes.

The production was evaluated in kg/ha with 86% dry matter.

ANOVA analysis was used to highlight the statistical differences, comparing the results obtained from every cultivar with the Bezostaia 1, which was the control variant.

RESULTS AND DISCUSSIONS

The major climatic changes in the last period of time have accentuated the influence of environmental conditions, especially the thermal regime and the pluviometric regime on the yields of agricultural crops (Săulescu *et al., 2006*).

Considering the fact that environmental conditions have not been favorable in recent years, observations on the behavior of winter wheat varieties have been made during two different agricultural years from a climatic point of view.

Tabel 1

Distribution of precipitations (mm) on the different phenophases of winter wheat, in the analyzed period

Month	Multiannual precipitation sum (mm)	Agricultural year		Winter wheat Phenophases	Multiannual precipitation sum (mm)	Precipitation sum (mm) 2015/16	Precipitation sum (mm) 2016/17
		2015 / 2016	2016 / 2017				
Oct.	34.4	66.40	212.00	Sowing - Emergency	69.00	170.60	281.80
Nov.	34.6	104.20	69.80				
Dec.	28.9	10.20	20.60	Winter reserve	113.30	152.80	465.00
Jan.	28.9	80.00	323.60				
Feb.	27.4	28.80	13.80				
Mar.	28.1	33.80	107.00				
Apr.	40.3	76.20	140.40	Increased growth - Flowering	92.80	146.60	213.20
Mai	52.5	70.40	72.80				
Jun.	75.1	142.40	71.60	Ripening	**75.10**	142.40	**71.60**
Jul.	69.2	24.00	84.40	Uncultivated land	167.60	87.60	146.20
Aug.	57.6	53.40	61.80				
Sept.	40.8	10.20	-				
Precipitation sum (mm)	**517.80**	**700.00**	**1177.80**				

Comparing the sum of precipitation recorded in each agricultural year studied with the multiannual precipitation sum, it can be observed that the sum of precipitations registered in every of this two agricultural years exceeds the precipitation average multiannual sum. In the agricultural year 2015/2016 the difference to the multiannual average sum was +182.2 mm and in the second year +663.0 mm (*Table 1*).

Analyzing the distribution of precipitations on the main wheat phenophases, it is easy to see that the sum of the precipitations was higher than the multiannual sum of the phenophase, with the exception of June 2017, when they were less quantitatively than the multi-annual sum of the phenophase.

Tabel 2

Average of temperatures (℃) registered on different phenophases of triticale, in the analyzed period

Month	Multiannual temperature average (℃)	Agricultural year		Winter wheat Phenophases	Multiannual temperature average (℃)	Temperature average (℃) 2015/16	Temperature average (℃) 2016/17
		2015 / 2016	2016 / 2017				
Oct.	10.1	9.37	8.15	Sowing - Emergency	7.10	7.87	6.09
Nov.	4.1	6.37	4.03				
Dec.	-0.8	2.04	0.35	Winter reserve	-0.75	2.82	0.66
Jan.	-3.6	-2.54	-4.89				
Feb.	-1.9	5.26	-0.81				
Mar.	3.3	6.52	8.00				
Apr.	10.1	13.33	10.05	Increased growth - Flowering	13.10	14.32	13.06
Mai	16.1	15.31	16.07				
Jun.	19.4	20.86	21.11	Ripening	19.40	20.86	21.11
Jul.	21.3	22.64	21.64	Uncultivated land	19.40	20.76	21.79
Aug.	20.6	21.38	21.95				
Sept.	16.3	18.27	-				
Temperature average (℃)	**9.58**	**11.57**	**9.60**				

Analyzing the temperatures recorded during the studied period and comparing them with the multiannual average (*Table 2*), we notice the tendency of increasing the average annual temperature. Comparing the mean temperature of the main phenophases recorded in the two years studied with the multi-annual media temperature of the phenophase, the sowing-sunrise and the intense-blooming growth period recorded slightly lower temperatures than the multi-annual average of the phenophase. In the studied period, the coldest month was January-2017 (-4.90℃), and the warmest was July-2016 (22.64℃).

Tabel 3

The yields obtained at the winter wheat cultivars, in the analyzed period

No.	Cultivar	Agricultural year 2015 / 2016					Agricultural year 2016 / 2017				
		Production		Diffe rence (kg/ha)	P value	Signific ance	Production		Diffe rence (kg/ha)	P value	Signific ance
		kg / ha	% compar ed to control				kg / ha	% compare d to control			
1.	11368G1	5584.24±34.87	144.91	1730.53	0.00016	***	-	-	-	-	
2.	11424G1	4817.32±52.90	125.00	963.61	0.00185	**	6579.74±174.04	110.17	607.63	0.05856	ns
3.	11838G8	4577.89±65.04	118.79	724.18	0.00613	**	-	-	-	-	
4.	Andrada	5297.74±30.72	137.47	1444.03	0.00031	***	7180.31±348.38	120.23	1208.20	0.03366	*
5.	**Bezostaia 1 (C)**	**3853.71±120.44**	**100.00**	**0.00**	**-**	**-**	**5972.11±152.77**	**100.00**	**0.00**	**-**	**-**
6.	Boema	4536.78±106.55	117.72	683.07	0.01318	*	-	-	-	-	
7.	Codru	5095.37±102.34	132.22	1241.66	0.00142	**	7323.86±583.21	122.63	1351.75	0.08841	ns
8.	Dumbrava	4418.07±85.86	114.64	564.36	0.01885	*	7198.20±218.80	120.53	1226.09	0.01007	*
9.	Glosa	5168.59±46.05	134.12	1314.88	0.00052	***	6145.48±624.20	102.90	173.37	0.80068	ns
10.	Izvor	4268.87±86.68	110.77	415.16	0.04892	*	7104.10±305.61	118.95	1131.99	0.02957	*
11.	Litera	4302.72±121.85	111.65	449.01	0.05875	ns	6458.15±948.01	108.14	486.04	0.63936	ns
12.	Miranda FDL	5197.96±87.14	134.88	1344.25	0.00083	***	8174.68±547.82	136.88	2202.57	0.01795	*
13.	Otilia	5418.39±206.93	140.60	1564.68	0.00283	**	8027.93±449.44	134.42	2055.82	0.01234	*
14.	**Pajura**	**3548.00±64.59**	**92.07**	**-305.71**	**0.08892**	ns	7615.91±412.21	127.52	1643.80	0.02013	*
15.	Pitar	4560.67±220.90	118.35	706.96	0.04832	*	6780.61±374.28	113.54	808.50	0.11612	ns
16.	Semnal	6151.51±118.52	159.63	2297.80	0.00017	***	7600.20±235.22	127.26	1628.09	0.00438	**
17.	T.109-12	-	-	-	-		8325.78±292.48	139.41	2353.67	0.00204	**
18.	T.118-11	-	-	-	-		7849.69±607.97	131.44	1877.58	0.04013	*
19.	T.123-11	4360.77±195.24	113.16	507.06	0.09158	ns	7015.92±842.65	117.48	1043.81	0.28986	ns
20.	T.124-11	4301.88±146.73	111.63	448.17	0.07758	ns	7627.18±248.33	127.71	1655.07	0.00475	**
21.	T.143-11	-	-	-	-		8591.75±358.42	143.86	2619.64	0.00255	**
22.	T.150 -11	6382.90±43.60	165.63	2529.19	0.00004	***	-	-	-	-	
23.	T.19-10	4789.91±199.32	124.29	936.20	0.01586	*	6771.20±255.10	113.38	799.09	0.05481	ns
24.	T.42-05	4780.72±209.81	124.06	927.01	0.01859	*	-	-	-	-	
25.	T.55-01	6137.19±229.70	159.25	2283.48	0.00092	***	-	-	-	-	
26.	T.62-01	4202.10±272.92	109.04	348.39	0.30773	ns	-	-	-	-	
27.	T.95-12	-	-	-	-		7654.15±413.20	128.16	1682.04	0.01881	*
28.	**Unitar**	**6630.52±173.84**	**172.06**	**2776.81**	**0.00019**	***	8698.30±440.33	145.65	2726.19	0.00426	**
29.	**Ursita**	5990.43±122.29	155.45	2136.72	0.00024	***	**8827.64±269.57**	**147.81**	**2855.53**	**0.00077**	***
30.	Vestitor	-	-	-	-		8116.71±163.67	135.91	2144.60	0.00066	***
31.	Voevod	-	-	-	-		7399.94±674.41	123.91	1427.83	0.10786	ns
32.	Voinic	-	-	-	-		8319.40±258.66	139.30	2347.29	0.00145	**

(P>0.05) - not significant (ns)
(0.01<P<0.05) - significant (* / ^{O})
(0.001<P<0.01) - distinguished significant – (** / ^{OO})
(P<0.005) - highly significant (*** / ^{OOO})

During the analyzed period the wheat yields oscillated between a minimum of 3548.00 ± 64.59 kg / ha recorded in the variation represented by the Pajura variety in the agricultural year 2015-2016 and a maximum of 8827.64 ± 269.57 kg / ha recorded in the variant represented by the Ursita variety in the agricultural year 2016-2017.

In the first agricultural year of the 25 varieties studied statistically ensured differences were observed in the case of nineteen varieties, of which six were included in the group of significant positive differences, four in the group of distinct positive differences and nine in the group of very significant positive differences.

In the second year studied, statistically unsecured differences to the control variant were encountered in case of eight varieties. Statistical differences were observed in sixteen varieties, half of which showed significant positive differences, six distinct positive differences, and two very significant positive differences.

During the study period, the pathogens encountered in winter wheat crop were represented by *Blumeria graminis* f.sp. *tritici*

(DC) Speer., *Septoria tritici* Rob. et Desm. and *Puccinia recondita* f.sp. *tritici* Rob. et Desm.

The infection pressure caused by the foliar diseases produced by these pathogens showed different trends in the studied years. There is a link between the pressure of infection and the climatic conditions characteristic of each year. Comparing the results obtained in the two years we can observe the influence of the climatic conditions on the presence of diseases in wheat crops, the infection being much higher in the second year of observations, especially in the case of Powdery mildew and Septoria leaf blotch.

Tabel 4

Evolution of the degree of attack (DA%)of pathogens agents in winter wheat in the agricultural year of 2015-2016

No.	Cultivar	*Blumeria graminis* f.sp. *tritici* (DC) Speer.				*Septoria tritici* Rob. et Desm.				*Puccinia recondita* f.sp. *tritici* Rob. et Desm.			
		DA %	% compared to control	P value	Significance	DA %	% compared to control	P value	Significance	DA %	% compared to control	P value	Significance
1.	11368G1	0.34±0.10	9.09	0.01230	*	1.22±0.46	145.24	0.47629	ns	1.67±0.43	46.78	0.05659	ns
2.	11424G1	0.98±0.58	26.20	0.04636	*	1.37±0.30	163.10	0.17703	ns	0.34±0.29	9.62	0.00726	**
3.	11838G8	2.96±1.22	79.14	0.61760	ns	1.78±0.10	211.90	0.00379	00	0.50±0.31	14.10	0.00916	**
4.	Andrada	2.53±1.26	67.65	0.45818	ns	0.32±0.06	38.49	0.01767	*	4.27±0.66	119.61	0.46624	ns
5.	**Bezostaia**	**3.74±0.78**	**100.00**	**-**	**-**	**0.84±0.12**	**100.00**	**-**	**-**	**3.57±0.57**	**100.00**	**-**	**-**
6.	Boema	2.56±0.99	68.45	0.40185	ns	0.69±0.02	82.54	0.28679	ns	2.51±0.73	70.21	0.31718	ns
7.	Codru	1.02±0.18	27.27	0.02688	*	0.82±0.20	97.22	0.91562	ns	4.20±0.33	117.65	0.39567	ns
8.	Dumbrava	0.00±0.00	0.00	0.00856	**	0.08±0.02	9.92	0.00333	**	4.77±0.69	133.61	0.25153	ns
9.	Glosa	2.35±0.97	62.83	0.32715	ns	0.39±0.03	46.03	0.02037	*	3.63±0.29	101.77	0.92619	ns
10.	Izvor	1.44±0.45	38.50	0.06247	ns	0.27±0.21	31.75	0.07841	ns	2.28±0.53	63.77	0.17128	ns
11.	Litera	0.36±0.28	9.63	0.01503	*	0.90±0.38	106.75	0.89960	ns	1.85±1.71	51.82	0.39352	ns
12.	Miranda FDL	2.35±1.47	62.83	0.45133	ns	0.45±0.12	53.17	0.08228	ns	2.14±0.79	60.04	0.21795	ns
13.	Otilia	1.21±0.78	32.35	0.08268	ns	0.57±0.10	67.86	0.14967	ns	1.57±1.41	44.07	0.25893	ns
14.	Pajura	0.56±0.11	14.97	0.01541	*	0.14±0.03	16.27	0.00453	**	0.00±0.00	0.00	0.00337	**
15.	Pitar	0.99±0.97	26.47	0.09045	ns	0.80±0.21	95.24	0.86815	ns	0.06±0.06	1.77	0.00368	**
16.	Semnal	1.70±0.85	45.45	0.15078	ns	0.95±0.40	113.10	0.80895	ns	0.71±0.19	19.98	0.00903	**
17.	T.123-11	0.98±0.83	26.20	0.07262	ns	0.27±0.12	31.75	0.02845	*	3.19±1.39	89.26	0.81165	ns
18.	T.124-11	0.28±0.23	7.49	0.01297	*	0.45±0.06	53.57	0.04289	*	0.31±0.04	8.68	0.00474	**
19.	T.150 -11	0.64±0.26	17.11	0.01943	*	0.69±0.18	81.75	0.51139	ns	1.37±0.79	38.47	0.08808	ns
20.	T.19-10	0.21±0.11	5.61	0.01077	*	0.32±0.08	38.49	0.02286	*	3.93±0.35	110.08	0.62080	ns
21.	T.42-05	3.66±0.48	97.86	0.93453	ns	0.50±0.05	59.52	0.05538	ns	3.80±0.94	106.44	0.84420	ns
22.	T.55-01	1.57±0.57	41.98	0.08745	ns	0.65±0.10	76.98	0.28166	ns	4.04±0.37	113.07	0.53223	ns
23.	T.62-01	2.68±0.24	71.66	0.26076	ns	0.65±0.29	77.38	0.56923	ns	3.69±0.74	103.36	0.90430	ns
24.	Unitar	0.00±0.00	0.00	0.00856	**	0.81±0.15	96.83	0.88174	ns	0.57±0.09	15.97	0.00662	**
25.	Ursita	0.01±0.01	0.27	0.00864	**	0.98±0.36	116.67	0.73762	ns	0.45±0.26	12.61	0.00764	**

(P>0.05) - not significant (ns)
(0.01<P<0.05) - significant (* / ^{O})
(0.001<P<0.01) - distinguished significant – (** / ^{OO})
(P<0.005) - highly significant (*** / ^{OOO})

Examining the reaction of varieties to the main pathogens in the first year studied (*Table 4*), it was observed that the presence of the pathogen *Blumeria graminis* f.sp. *tritici* (DC) Speer. was encountered in the case of twenty three varieties.

Unitar and Dumbrava varieties did not show the presence of this pathogen which recorded the highest value of DA% in the Bezostaia 1 variant, which also represents the control variant of the experience. Following the observations made in the field, the presence of the pathogen *Septoria tritici* Rob et Desm. was also identified. This pathogen was observed in all the variants studied, the highest value of DA% was recorded in the variant represented by cultivar 11838G8 (1.78%) distinctly significant value compared to the control variant of experience (0.84% - Bezostaia 1).

The third pathogen, *Puccinia recondita* f.sp. *tritici* Rob. et Desm., present in the wheat crop, was present in all variants studied, with the exception of the Pajura variant. The highest value of DA% was recorded in the Dumbrava variety (4.77%) but not statistically assured compared to the control variant (3.57%). Significantly positive values were noted in case of eight cultivars.

In the second year studied the degree of infection was higher for pathogens *Blumeria graminis* f.sp. *tritici* (DC) Speer. and *Septoria tritici* Rob. et Desm.; *Puccinia recondita* f.sp. *tritici* Rob. et Desm. was found sporadically in the case of same varieties.

In the case of powdery mildew, the highest value of DA% was given by cultivar Andrada (4.27%), but this value was not statistically insured against the control variant (Bezostaia 1 - 3.68%). The lowest value of DA% was recorded by cultivar T.123-11 (0.43%), this values was distinquished significant to the control variant of the experience.

The DA% of the *Septoria tritici* Rob et Desm. recorded values ranged between 0.60% (11424G1) and 3.46% (Bezostaia 1). Significant values, statistically assured compared with the control variant were recorded in the variants represented by Voinic, Vestitor, T.19-10, T.143-11 and Dumbrava, and in the case of cultivar11424G1 the difference was distinctly significant.

Puccinia recondita f.sp. *tritici* Rob. et Desm. was not present in the case of thirteen varieties. In the case of other varieties, the presence of this pathogen was observed with different DA% values, the highest being registered by cultivar Andrada .

Tabel 5

Evolution of the degree of attack (DA%)of pathogens agents in winter wheat in the agricultural year of 2016-2017

No.	Cultivar	***Blumeria graminis* f.sp. *tritici* (DC) Speer.**				***Septoria tritici* Rob. et Desm.**				***Puccinia recondita* f.sp. *tritici* Rob. et Desm.**			
		DA %	% compared to control	P value	Significance	DA %	% compared to control	P value	Significance	DA %	% compared to control	P value	Significance
1.	11424G1	1.14±0.11	30.98	0.01451	**	0.60±0.21	17.34	0.00993	**	0.00±0.00	0.00	0.00726	**
2.	Andrada	4.27±0.63	116.03	0.53303	ns	2.26±0.52	65.32	0.19909	ns	1.92±0.94	137.14	0.62229	ns
3.	**Bezostaia 1(C)**	**3.68±0.61**	**100.00**	**-**	**-**	**3.46±0.59**	**100.00**	**-**	**-**	**1.40±0.28**	**100.00**	**-**	**-**
4.	Codru	3.36±0.08	91.30	0.63508	ns	1.96±0.14	56.65	0.06822	ns	1.11±0.28	79.29	0.50000	ns
5.	Dumbrava	1.66±0.18	45.11	0.03335	*	1.10±0.49	31.79	0.03680	*	1.71±0.88	122.14	0.75265	ns
6.	Glosa	3.31±0.13	89.95	0.58194	ns	2.68±0.62	77.46	0.41055	ns	1.16±0.21	82.86	0.51738	ns
7.	Izvor	2.81±0.37	76.36	0.29052	ns	1.79±0.24	51.73	0.05788	ns	0.00±0.00	0.00	0.00726	**
8.	Litera	2.48±0.28	67.39	0.14751	ns	3.30±0.73	95.38	0.87284	ns	0.38±0.19	27.14	0.03780	*
9.	Miranda FDL	1.59±0.18	43.21	0.02953	*	2.31±0.55	66.76	0.22554	ns	2.39±0.53	170.71	0.17433	ns
10.	Otilia	1.60±0.06	43.48	0.02697	*	2.17±0.46	62.72	0.15771	ns	0.00±0.00	0.00	0.00726	**
11.	Pajura	1.44±0.18	39.13	0.02405	*	1.95±0.74	56.36	0.18627	ns	0.00±0.00	0.00	0.00726	**
12.	Pitar	0.55±0.03	14.95	0.00670	**	3.35±0.37	96.82	0.88150	ns	0.00±0.00	0.00	0.00726	**
13.	Semnal	3.39±0.35	92.12	0.70536	ns	2.91±0.24	84.10	0.43603	ns	0.00±0.00	0.00	0.00726	**
14.	T. 109-12	1.63±1.01	44.29	0.15739	ns	1.83±0.32	52.89	0.07192	ns	0.63±0.41	45.00	0.19709	ns
15.	T. 118-11	3.08±0.40	83.70	0.45832	ns	2.97±0.92	85.84	0.67703	ns	0.83±0.17	59.29	0.15454	ns
16.	T. 123-11	0.43±0.05	11.68	0.00591	**	1.77±0.71	51.16	0.13925	ns	0.00±0.00	0.00	0.00726	**
17.	T. 124-11	0.44±0.06	11.96	0.00600	**	3.39±1.00	97.98	0.95681	ns	0.00±0.00	0.00	0.00726	**
18.	T. 143-11	0.60±0.10	16.30	0.00742	**	1.16±0.37	33.53	0.02940	*	0.14±0.14	10.00	0.01539	*
19.	T. 19-10	3.20±0.28	86.96	0.51614	ns	1.28±0.41	36.99	0.03824	*	1.46±0.74	104.29	0.94323	ns
20.	T. 95-12	3.12±0.17	84.78	0.42385	ns	3.84±0.65	110.98	0.68441	ns	0.58±0.18	41.43	0.06763	ns
21.	Unitar	1.68±0.12	45.65	0.03202	*	2.95±0.87	85.26	0.65347	ns	0.00±0.00	0.00	0.00726	**
22.	Ursita	0.61±0.08	16.58	0.00742	**	2.10±0.80	60.69	0.24335	ns	0.00±0.00	0.00	0.00726	**
23.	Vestitor	3.08±0.23	83.70	0.40704	ns	1.03±0.42	29.77	0.02763	*	0.00±0.00	0.00	0.00726	**
24.	Voevod	3.44±0.59	93.48	0.79316	ns	1.81±0.36	52.31	0.07463	ns	0.00±0.00	0.00	0.00726	**
25.	Voinic	4.15±0.54	112.77	0.59492	ns	1.07±0.31	30.92	0.02283	*	0.00±0.00	0.00	0.00726	**

(P>0.05) - not significant (ns)
(0.01<P<0.05) - significant (* / ^{O})
(0.001<P<0.01) - distinquished significant – (** / ^{OO})
(P<0.005) - highly significant (*** / ^{OOO})

CONCLUSIONS

Studying the behavior of wheat varieties in terms of climatic conditions and the presence of pathogens that produce diseases with negative influences on the quantity and quality of production is necessary for a good characterization and correct recommendation as to how each cultivar reacts to abiotic and biotic conditions of stress.

As a result of the different climatic conditions characteristic of the studied years there was a variability of the wheat production from one year to the next.

Wheat crop studied, under the influence of climate conditions that favored the presence of pathogens, reacted differently from the pathogens encountered.

The Andrada cultivar recorded the highest DA% value of the *Blumeria graminis* f.sp. *tritici*

(DC) Speer., and in the case of Ursita cultivar this pathogen was present with the lowest values.

Septoria tritici Rob. et Desm. has encountered the highest value of DA% in cultivar T.95-12 and the lowest value in cultivar Dumbrava.

Puccinia recondita f.sp. *tritici* Rob. et Desm. was recorded the lowest. The highest value of DA% was given by Dumbrava cultivar. In the first year of study, the Pajura variety did not record the presence of the pathogen, and in the second year a series of thirteen varieties were free of attack.

Analyzing the two climatically studied years and the presence of pathogens, we can see the influence of climatic conditions on the occurrence and development of pathogens that were found with a higher DA% in the second year of observations when the temperature and the sum of precipitations created conditions for the development of pathogens.

The exception makes *Puccinia recondita* f.sp. *tritici* Rob. et Desm. which appeared in the wheat crop when it was in a late stage of vegetation, and the infection pressure was lower.

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