RESEARCH REGARDING DISEASE RESISTANCE OF SOME WHEAT VARIETIES IN THE CLIMATIC CONDITIONS DURING THE YEARS 2012-2013 AT EZĂRENI FARM, IASI

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Abstract

Although there is great progress regarding the presence and control of pathogens in wheat crops the producers are constantly concerned with this aspect, their attack being present each year, with different intensities and causing damage in average between 4% to 20% of production. Tracking the behavior of new wheat varieties in the climatic conditions of the growing area, the studing of the wheat varieties resistance to pathogens attack is also required. The main objective of this study was to assess the plant health of 24 wheat varieties, domestic and imported, in the central area of Moldavia conditions. Observations were made in the crop year of 2012-2013, at Ezareni Farm from USAMV, Iasi. Studied varieties showed different reactions in the same environmental conditions. Thus, resistant *to Blumeria graminis* f. sp. *tritici* March pathogen attack were the Kiskun Serina, Andalou and Crina varieties and to the attack of *Septoria tritici* Rob. et Desm. and *Puccinia recondita* Rob. et Desm. a good resistance was noted on the varieties Ariesan, Arezzo, GK Kalasz, Exotic, Boema and Dropia.

Key words: pathogens, resistance, wheat varieties.

During the vegetation period, the wheat crop is under the pressure of attack by pathogens causing foliar diseases such as powdery mildew, rust and septoria .

The conditions for the emergence and evolution of pathogens in cereals as well as the fight to avoid damage, requires good knowledge of ecological features of wheat crop (Hatman M., Viorica Iacob, 1981). Even though today there are many fungicides for most pathogens which attack wheat, given the large area that this plant is grown on and the additional expenses necessary to carry out treatment, an important solution to combat is the use of resistant or tolerant varieties.

Currently, the varieties grown in our country have differentiated behavior to diseases especially in the context of climate change. For this reason we need a permanent research on the behavior of wheat to pathogen attack.

MATERIAL AND METHOD

The experience was found in the year 2012-2013 and it is based randomised complete block. The experience was founded after the experimental technique rules and it was applied the specific technology of wheat culture. For the weed control it was applied Lintur 70 WG in the dose of 150g/ha. The experimental plot size was 1.8 m^2 and the total area of the experience was of 265 m^2. On the experimental plot the wheat was sown in 10 rows with a distance of 12.5 cm between them.

The biological material studied was 24 wheat varieties originating from our country and imported. The disease incidence (GA%) of the pathogens was determined based on the frequency (F%) and the intensity (I%) of the encountered diseases. For determining the disease incidence of *Blumeria graminis (DC.) Speer*. and *Septoria tritici Rob. Desm.* on the plant, the affected surface was reported to the total surface, using a six classes scale corresponding to intervals percent attack intensity (Pastircak M., 2005; Bennett F.G.A., 1984). In order to determine the level of infection with *Puccinia* Rob. et Desm. we used a standardized grading scale rust on cereals (Severin V. and Cornea C.P., 2009).

RESULTS AND DISCUSSIONS

The observations allowed the timing of the onset and epidemic evolution of the pathogens and knowledge of the wheat behavior to pathogen attack, depending on climatic conditions.

In the agricultural year 2012-2013 the annual average temperature registered a value of 9.5^0C having 0.9^0C positive deviation from the annual average. During the growing season, the highest temperatures were in the range from April to June with positive values to the annual average, except July, at which the deviation was negative.

The coldest month of the year was December when there was an average minimum temperature of -3.9 °C 0C being -20.34. In July the average value was 20.1°C to 21.3°C, with a

difference of -1.2 0C to annual average (*figure 1*). Rainfall this year agriculture were shaped by positive deviations in all months from the annual average. Amount of annual rainfall was 741.2 mm with a positive deviation from the annual average 281mm.

In winter, in November, there was a deficit of 6.8 mm less than the annual average (*table 1*).

Maximum rainfall was recorded in May (143.6 mm) 68.5 mm more than the annual average.

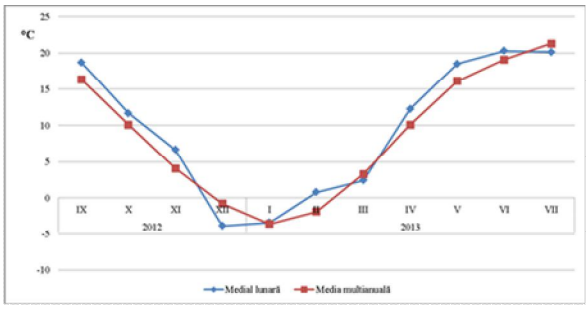

Figure 1 **Monthly average temperatures recorded in the agricultural year of 2012-2013**

Table 1

Rainfall recorded at the meteorological station Miroslava in the agricultural year of 2012-2013

Months Specification	2012				2013								Anual sum
	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	
Rainfall Monthly average (mm)	71.6	48	27.8	55.4	37.0	31.4	93.4	45.8	103.4	143.6	83.8	79.6	741.2
Multianual average (mm)	40.8	34.4	34.6	28.9	28.9	27.4	28.1	40.3	52.5	75.1	69.2	57.6	460.2
Diference ±	30.8	13.6	-6.8	26.5	8.1	4.0	65.3	5.5	50.9	68.5	14.6	22.0	281.0

Regarding the presence of pathogens observed in the experiment with wheat, the crop year 2012-2013 were reported diseases such as powdery mildew, caused by *Blumeria (Erysiphe) graminis* f. sp. *tritici* March, septoria produced by *Septoria. tritici* Rob. Desm. and rust caused by *Puccinia recondita* Rob. et Desm. The presence of these pathogens has been reported since late May when most varieties were studied in the flowering stage or in the 10.5 stage according to the scale of Feekes (Marsalis M.A., Goldberg Natalie P., 2006).

Thus, based on observations in the field, every variety of wheat to determine attack *Blumeria (Erysiphe) graminis* f. sp. *tritici* March. After calculating it was found that the presence of the pathogen was observed in 12 varieties (*figure 2*).

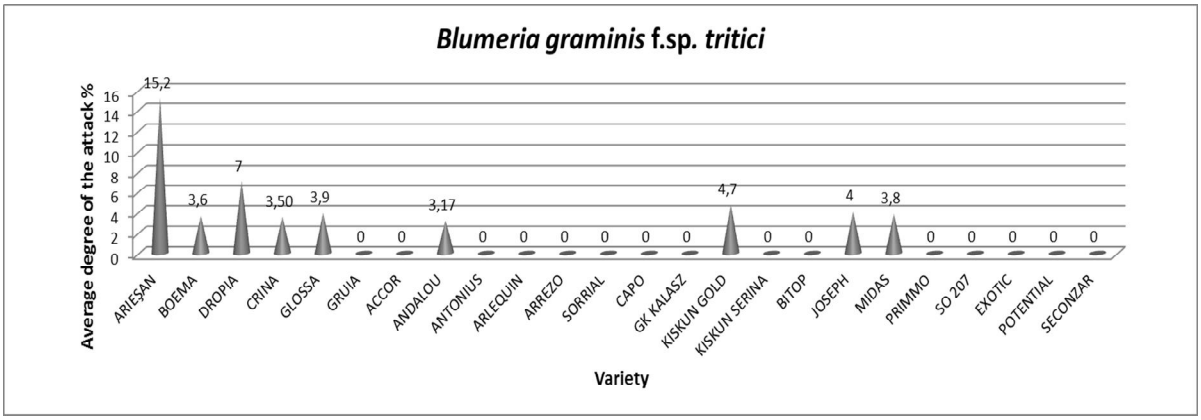

Figure 2 **Evolution of attack *Blumeria graminis* f sp. *tritici* in the agricultural year of 2012-2013**

The most resistant varieties to attack of *Blumeria (Erysiphe) graminis* f. sp. *tritici* March have been shown to be Kiskun, Serina, Andalou, Crina values were 1-5% degree of attack. The most susceptible variety was Ariesan, who experienced a degree of attack 15.17%.

In terms of the agricultural year 2012-2013, septoria was observed in 10 varieties of the attack recorded values between 0.3 and 6.10%. The lowest values of the attack produced by *Septoria tritici* Rob. et Desm. registred on the varieties Accor, Bitop, Ariesan, Boema, Kiskun Gold and Capo, these having good resistance to the attack of septoria according to the scale of evaluation of

Eyal (1987).

The highest values of the attack there were varieties Arlequin, Arezzo and Antonius Antonius with values between 3.7 and 6.1% (*figure 3*).

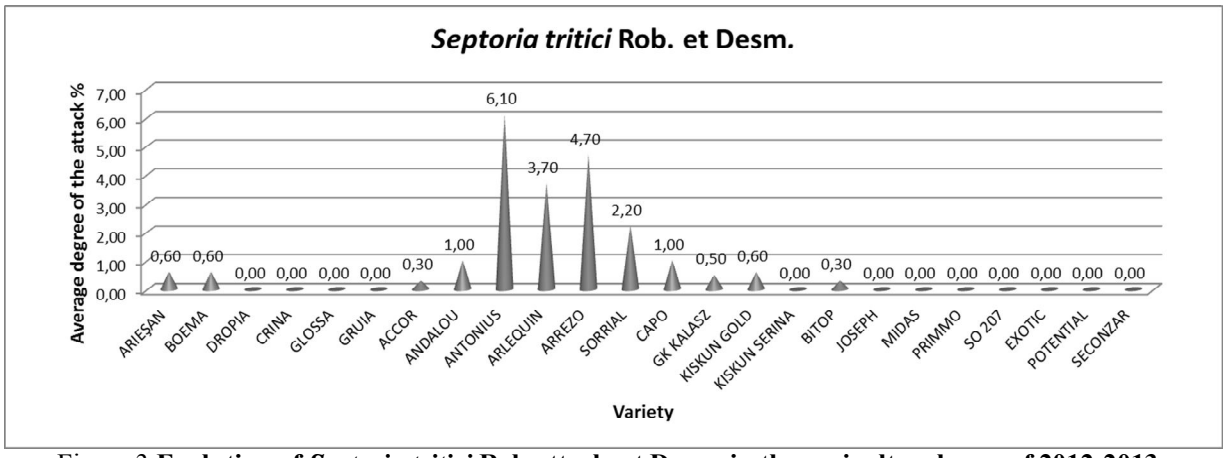

Figure 3 **Evolution of *Septoria tritici* Rob attack. et Desm. in the agricultural year of 2012-2013**

Regarding the attack of *Puccinia recondita,* in terms of agriculture 2012-2013, field observations reveal the presence of this pathogen in most varieties studied. Following the observations made, it is clear that a good resistance to this pathogen attack have shown the varieties Arieşan, Arezzo, GK Kalasz, Exotic, Boema, Dropia which recorded the attack values between 1 and 2%, and the most sensitive varieties were SO 207, Arlequin şi Kiskun Gold who obtained values of the attack of 14.3, 16.8 and 17.8% (Figure 4).

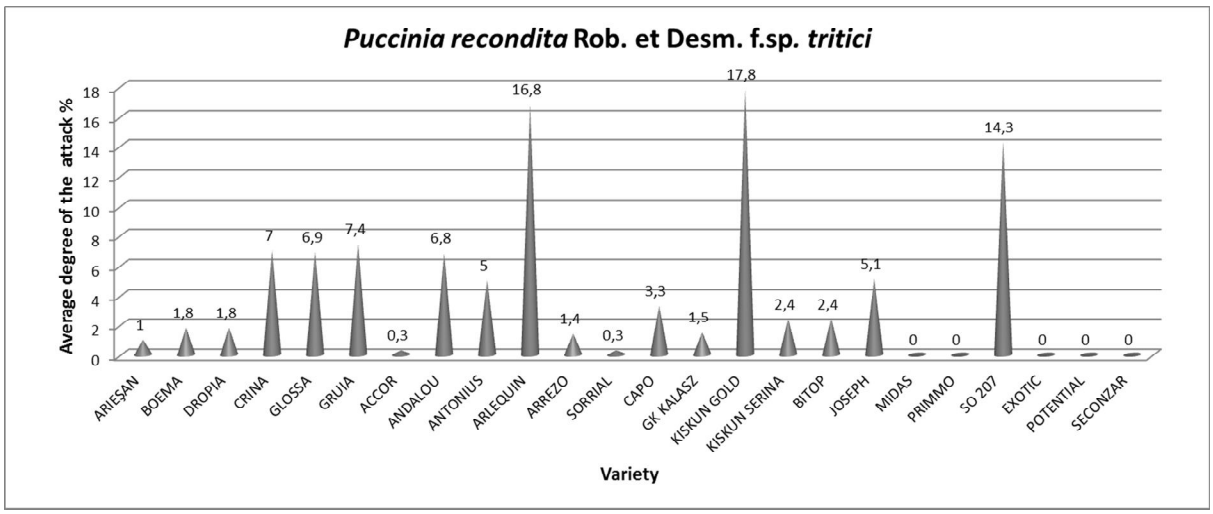

Figure 4 **Evolution of *Puccinia recondita* f.sp. *tritici* Rob. et Desm. attack in the agricultural year of 2012-2013**

Regarding the varieties Andalou, Accor and Capo during the growing season small chlorotic spots were observed, which appeared as a defense response to the attack of *Puccinia recondita* Rob. et Desm.- hypersensitive resistance.

CONCLUSIONS

The climate of the agricultural year 2012-2013 have favorized the appearance and growth of the pathogens *Blumeria (Erysiphe) graminis* f. sp. *tritici* March, *Septoria tritici* Rob. et Desm. and *Puccinia recondita* f.sp. *tritici* Rob. et Desm.

Regarding the degree of pathogen attack *Blumeria graminis* f. sp. *tritici* March resistance against it proved the varieties Kiskun Serina, Andalou and Crina who obtained values of the attack between 1-5%. The most susceptible variety was Ariseşan which recorded a high attack value of 15.17%.

The varieties that have been shown to be resistant to attack by the pathogen *Septoria tritici* Rob. et Desm are varieties Ariesan, Arezzo, GK

Kalasz, Exotic, Boema, Dropia, varieties recorded value of the attack below 2%. The most sensitive variety to attack the pathogen was Antonius the attack value of 6.1%.

The most susceptible cultivars to pathogen attack *Puccinia recondita* Rob. et Desm. have been shown to be varieties SO 207, Arlequin and Kiskun Gold values of the attack between 14 and 17,8%. Good resistance to this pathogen attack proved varieties Arieşan, Arezzo, GK Kalasz, Exotic, Boema, Dropia which recorded values of the attack between 1 şi 2%.

ACKNOWLEGMENTS

This paper was published under the frame of European Social Fund, Human Resources Development Operational Programme 2007-2013, project no. POSDRU/159/1.5/S/132765.

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