

THE BEHAVIOR OF NEW BARLEY AND WHEAT VARIETIES AT S.C. SPORT AGRA-AMZACEA, UNDER 2018 CONDITIONS

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Abstract: The paper presents the behavior of some wheat and barley varieties under 2018 conditions in Dobrogea area. In demonstrative plots carried out at S.C. SPORT AGRA SRL Amzacea, Constanța County is presented data about the main pathogens and yield results. Climatic conditions of autumn 2017 and spring 2018 favoured a major attack of pathogens. For barley a high attack of *Rhynchosporium secalis* with an attack rate (AR) of 6-30% and *Pyrenophora teres* in a lower attack rate of 3-20% in most varieties was reported in the April 17 observations. For wheat, *Septoria tritici* showed an AR between 18-23.5% and *Pyrenophora tritici-repentis* showed a low attack (AR= 4.5-17.5%). The pathogen *Puccinia striiformis* was present in low percentage (AR= 1-13.5%) in the April 17 observations. For crop protection against pathogens, 2 foliar treatments with fungicides were applied, Artea 330 EC in March and Priaxon EC in April respectively. After the last treatment with very good efficacy, there was noticed a decrease in the attack on most pathogens in May 8 observations. Fungal treatments have stopped the development of foliar and ear diseases. The beneficial effects were found in the good yields obtained. For barley crop, yields were 7800 kg/ha for Predator and 8500 kg/ha for Panonic variety. Wheat cultivation yields ranged from 7425 kg/ha for Miranda and 8025 kg/ha for Avenue to 8300 kg/ha for Kraljica variety. Quality indices ranged from 70.4 to 77.5% for hectolitre weight and 11.9-14.5% for protein. All these special yields have been obtained under non-irrigated conditions.

Key words: *barley, wheat, pathogens, yields*

INTRODUCTION

Romanian winter grains varieties occupy a percentage of more than 70% of the cultivated area (Roman et al., 2011). Even if new varieties of wheat and barley have more yield to offer, breeders must take into account the resistance to pathogens attack and quality indices. These tools may vary depending on the cultivated area, so there is a need for demonstration plots in different areas. The efficiency of integrated control is directly dependent on the biology of the pest, parasite-host plant relationship, being influenced by climatic conditions that characterize a particular crop area or a certain stage of the plant vegetative cycle (Jinga et al., 2010, 2017). The increase of draught areas made necessary the testing of drought-resistant barley lines identified through extensive field testing and selection in a decentralized participatory breeding programme (Ceccarelli et al., 2007).

The paper aimed to present the main pathogens of barley and wheat crops varieties, quality indices and the yields obtained in 2018 at S.C. SPORT AGRA SRL Amzacea, Constanța County, on demonstrative plots.

MATERIALS AND METHODS

Twelve wheat varieties and three barley varieties were analyzed regarding their behavior under climatic conditions from Amzacea area, in agricultural year 2017-2018. The climatic conditions of autumn 2017 and spring 2018 favored a strong attack by pathogens.

Experience has been placed at S.C. SPORT AGRA S.R.L. Amzacea, Constanta County. The studied crops were winter crops: barley and wheat. The experience was situated on a land belonging to the South Dobrogea Plateau, represented by cambic chernoziom with a profile deeper than other chernozioms, a blackish-brown soil of 40-50 cm thickness, medium texture (Demeter, 2009). The content of nutrients was: mobile P index - 72; N index - 4; K index - 200; humus - 3.11%; neutral pH - 7.2. The climate is deeply temperate continental, with an average annual temperature of 10.7 - 11.7°C, with a high temperature in the period 20th June to 15th August. Quantity of precipitations during the vegetation period is presented in Table 1.

Table 1. Precipitation during 2017/2018 growing season of barley and wheat (Amzacea, Constanta)

	Month											Sum
	Oct.	Nov.	Dec.	Jan.	Febr.	March	Apr	May	June	July	Aug.	
The growing season 2017/2018: Precipitation (mm) for 10-day periods												
1-10	41	18	9	0	9	6	2	64	35	98	0	282
11-20	0	30	23	44	31	37	0	28	0	2	0	195
21-31	14,5	17	18	19	80	26	0	28	41	47	0	290,5
Sum	55,5	65	50	63	120	69	2	92	76	147	0	739,5
Average 1961-1990: monthly values of precipitation (mm)												
	34,3	42,4	41,0	27,7	24,0	29,1	31,8	37,7	47,1	38,9	37,4	464,0

This area is the most arid in the country, with 69-year multi-annual average rainfall of 401 litters. Sowing was carried out on 7th October 2017. Treatment of seeds was carried out with Yunta Quattro 373.4 FS (clotianidin 166.7 g/l + imidacloprid 166.7 g/l + protioconazol 33.3 g/l + tebuconazol 6.7g/l) in dose of 1.6 l/tonne. Due to the climatic conditions of the year 2018, for the prevention and control of foliar and ear diseases, 2 treatments were performed: Treatment I (March17) - Artea 330 EC (cyproconazole 80 g/l + propiconazol 250 g/l) 0.4 l/ha; Treatment II (April20) - Priaxor EC (piraclostrobin 150 g/l + fluxapiroxad 75 g/l) 1 l/ha; Karate Zeon 50 CS (lambda-cyhalothrin 50 g/l), at a dose of 0.75 l/ha were used for specific pest control.

The attack rate (AR) was calculated with the formula $AR = F \times I / 100$ (F% -frequency of the attacked organs, I % -intensity of organs' attack). Observations on phytosanitary status of winter crops and collections of biological samples were made on April 17 and May 8, 2018. Some of technological elements such as seed norm, plant density in autumn and spring, inflorescence emergence and flowering dates, plant height, yields and quality indices were evaluated.

RESULTS AND DISCUSSIONS

Observations on phytosanitary status of winter crops (Figures 1) and collections of biological samples were made on April 17 and on May 8, 2018 (Table 2 and 3). The technological elements such as seed norm, plant density in autumn and spring, inflorescence emergence and flowering dates, plant height, yields and quality indices are presented in Table 4.

Due to the high rainfall throughout during March and May, the attack of pathogens that cause diseases in cereal crops was very aggressive, requiring the 2 pesticides treatments. The last treatment with Priaxor EC reduced the intensity of the attack at a low level.



Figure 1- Autumn grain crops - field trial (left) and phytosanitary status (right)

Table 2. Autumn cereals phytosanitary status - April 17

Two-rowed Autumn Barley + Autumn Barley									
Variety	<i>Rhynchosporium secalis</i>			<i>Pyrenophora teres</i>			<i>Pyrenophora graminis</i>		
	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)
Bingo	100	30	30	30	10	3	70	15	10.5
Panonic	40	15	6	90	20	18	40	5	2.0
Predator	60	10	6	80	25	20	80	30	2.4
Wheat									
Variety	<i>Septoria tritici.</i>			<i>Pyrenophora graminis</i>			<i>Puccinia striiformis</i>		
	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)
Avenue	100	20	20	70	20	14	25	5	1.25
Katarina	90	25	23.7	25	20	5	0	0	0
Miranda	100	20	20	70	25	17.5	0	0	0
Litera	70	30	21	45	20	9	0	0	0
Kraljca	80	25	20	35	15	5.3	20	5	1.0
Spranjca	75	25	18.7	45	10	4.5	30	5	1.5
Fiji	80	25	20	80	15	12	90	15	13.5
Silvja	90	30	27	70	25	17.5	0	0	0
Bubimir	80	25	20	40	30	12	20	7	1.4
El Nino	85	25	21.3	45	30	13.5	25	10	2.5
Tata Mata	80	30	24	35	25	8.7	0	0	0
Pepeljura	85	20	17	40	30	12	0	0	0

For barley, pathogen attack of *Rhynchosporium* sp. in April 17 observations presented an AR between 6 and 30% and for *Pyrenophora* sp. a lower percentage between 3 and 20%.

For wheat, a very strong attack of all three pathogens was in April 17 observations. For *Septoria* sp. the AR ranged between 17 and 27%, *Pyrenophora* sp. between 5 and 17.5% and *Puccinia* sp. between 1 and 13%.

Table 3. Autumn cereals phytosanitary status -May 8

Two-rowed Autumn Barley + Autumn Barley									
Variety	<i>Rhincosporium secalis</i>			<i>Pyrenophora teres</i>			<i>Pyrenophora graminis</i>		
	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)
Bingo	6	2	0,1	3	1	0,01	0	0	0
Panonic	0	0	0	0	0	0	0	0	0
Predator	0	0	0	2	1	0,01	0	0	0
Wheat									
Variety	<i>Septoria tritici.</i>			<i>Pyrenophora graminis</i>			<i>Puccinia striiformis</i>		
	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)	F (%)	I (%)	AR (%)
Avenue	5	2	0.1	0	0	0	5	1	0.05
Katarina	0	0	0	5	2	0,1	0	0	0
Miranda	0	0	0	0	0	0	0	0	0
Litera	0	0	0	0	0	0	0	0	0
Kraljca	8	2	0.1	0	0	0	2	1	0.02
Spranjca	5	2	0.1	0	0	0	5	2	0.1
Fiji	0	0	0	0	0	0	7	1	0.07
Silvja	5	3	0.1	0	0	0	0	0	0
Bubimir	8	2	0.1	0	0	0	2	1	0.02
El Nino	5	2	0.1	0	0	0	5	1	0.05
Tata Mata	10	3	0.3	0	0	0	0	0	0
Pepeljura	5	2	0.1	0	0	0	0	0	0

After the 2 fungicide treatments, foliar diseases were stopped at basal leaves. For barley the attack decreased completely for all three pathogens analyzed. Also, the fungicide applied to the wheat stopped the pathogen attack both on the last leaf and on ear, very significant.

Table 4. Technological sheet for autumn crops

Variety	Seed norm (kg /ha)	Plant density in the autumn 14.11.2017	Plant density in the spring 11.01.2018	Inflorescence emergence date	Flowering date	Plant height (cm)	Yield (kg/ ha)	Quality index	
								M HI (kg/hl)	Protein (%)
Two-rowed Autumn Barley + Autumn Barley									
Bingo	2220	520	888	April 20	April 28	73	7375	70.5	-
Panonic	2220	522	868	April 26	May 3	101	8500	70.6	-
Predator	2220	534	848	April 23	May 2	86	7875	70.6	-
Wheat									
Avenue	2220	440	772	April 27	May 4	71	8026	74.6	11.9
Katarina	250	422	828	April 30	May 7	70	7475	76.9	12
Miranda	250	468	660	May 3	May 8	94	7425	75.6	12.3
Litera	250	495	684	May 4	May 8	95	7125	74.2	12.4
Kraljca	250	484	812	May 1	May 5	68	8300	74.5	12.3
Spranjca	250	534	784	May 1	May 9	65	8106	75.2	11.9
Fifi	250	472	732	May 3	May 9	76	6666	77.0	14.5
Silvja	250	445	672	May 2	May 7	80	7675	77.2	12.7
Bubimir	250	432	764	May 2	May 7	71	6575	77.5	12.6
El Nino	250	476	796	April 30	May 5	75	8125	76.5	12.5
Tata Mata	250	502	772	May 4	May 9	87	7475	70.4	12.5
Pepeljura	250	464	784	May 4	May 9	91	7920	73.1	11.9

Technology applied has stopped the attack of pathogens and obtained very good yields for wheat and barley ranging between 6500 - 8300 kg/ha and between 7375-8500 kg/ha respectively. Quality indices show very good values (MHL= 70.4-77.5 kg/hl and protein over 11%). The best results were obtained with PANONIC - 8.5 to/ha for barley, EL NINO - 8.1 and 8.3 tons/ha - KRALJICA for wheat.

CONCLUSIONS

The heavy rainfall from March 2018 led to a very high attack of pathogens. After the second treatment applied in April, the attack was considerably reduced.

The productions obtained this year were very good considering that they were obtained with non-irrigation technology.

To prevent and control the pathogens that cause diseases in autumn cereal crops, 2 treatments with fungicides were necessary under climatic conditions of 2018, the beneficial effects were found in the good yields obtained. For wheat crop, pathogens *Septoria* sp. and *Pyrenophora* sp. showed reduced attack rates, compared to *Puccinia* sp. The yields obtained under 2018 conditions ranged between 7375 and 8500 kg/ha and good quality index (hectolitre weight = 70.6 kg/hl) for barley. For wheat yields recorded were between 6575 and 8300 kg/ha. For all wheat varieties analyzed, hectolitre weight was influenced by rainfall, showing values between 70.4 and 77.5 kg/hl.

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