

BEHAVIOUR OF NEW WINTER GRAIN VARIETIES IN SOUTH DOBROGEA

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Abstract

The paper aimed to present the main pathogens of wheat, barley and two-rowed barley crops and the yields obtained in 2014 at S.C. SPORT AGRA SRL Amzacea, Constanta district on demonstrative plots. Climatic conditions of autumn 2013 and spring 2014 provided a favorable development of small grains studied. Protection against foliar diseases of the three cereal crops was done using three treatments with Bumper 250 EC, Artea 330 EC and Prosaro 250 EC fungicides, no attack of powdery mildew (*Blumeria graminis*) was registered. The attack of *Rhynchosporium secalis* and *Pyrenophora tritici-repentis* in barley and two-rowed barley presented a low level, except the Casanova barley variety (10.8%). On wheat, the pathogens *Septoria tritici* and *Pyrenophora tritici-repentis* had low attack levels, except the cultivars *Akratos*, *Renan*, *Jinda*, *Epos* and *E vina* with higher attack. The pathogen *Puccinia striiformis* had the lowest values of attack, except the variety *Andelka* (5%). Concerning the correlation between the yields and the pathogens incidence and severity, the lowest yields in wheat crop were obtained with *Arkeos* (4250 kg/ha) and *Renan* varieties (4300 kg/ha). The highest yields were obtained with *Ingenio* (7600 kg/ha) and *Katarina* varieties (7930 kg/ha). For barley crop, the lowest yield was 5858 kg/ha for *Gerlach* and *Casanova* varieties and the best yields were 7500 kg/ha for *Kendy* variety and 8000 kg/ha for *Laverda* variety. To the two-rowed barley crops, the yields were between 5600 kg/ha for *Trasco* variety and 6200 kg/ha for *Metaxa* variety. Quality indices of wheat grains were between 72 and 78.7% hectoliter mass.

Key words: behaviour, winter grain, phytosanitary status, production, Dobrogea.

INTRODUCTION

Romanian varieties of winter wheat occupies a percentage of more than 70% of the cultivated area (Muntean et al., 2003).

In the last 10 years, various cereal varieties created by foreign companies have been cultivated without being deeply known their behavior in the climatic conditions of Dobrogea.

Our research aims to analyze the behavior of 17 varieties of wheat, 8 varieties of barley and 3 varieties of two-rowed barley, in climatic conditions from Amzacea area in agricultural year 2013-2014, atypical in terms of rainfall. 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., 2013).

MATERIALS AND METHODS

Experience has been placed on S.C. SPORT AGRA S.R.L. Amzacea, Constanta. The studied crops were winter crops: barley, two-rowed 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; Humus - 3.11; K index - 200; 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. Meteorological data are presented in Table 1. Sowing was carried out on 16th October 2013. Treatment of seeds was carried out with thiamethoxam + fludioxinil + difenoconazole in dose of 1.5 l/t.

Due to the climatic conditions of the year 2014, for the prevention and control of foliar and ear diseases, 3 treatments were performed: Treatment I *Bumper 250 EC* prochloraz 45%), 1 l/ha; Treatment II *Artea 330 EC* - (cyproconazole 80 g/l + propiconazole 250 g/l) 0.4 l / ha; Treatment III - *Prosaro 250 EC* - (tebuconazole 125 g/l + prothioconazole 125 g/l) 0.75 l / ha. Lambda-cyhalothrin 50 g/l, at a dose of 0.15 l/ha were used for specific pest control. Observations and collections of biological samples were made on April 2014 in terms of knowledge of technological elements such as: prior crop, basic fertilization, sowing date, amount of seed, emergence date, plant density (Table 2).

The attack rate was calculated with the formulas $RA\% = F \cdot I / 100$, F%-frequency of the attacked organs, I – intensity of the organ' attack.

Table 1. Meteorological data 2013-2014

Month	Temp monthly average °C	Temp min °C	Temp max °C	Rainfall mm	Humidity %
Sept	18.6	14.5	22.7	2.1	60.1
Oct	13.2	9.9	16.4	3.0	77.9
Nov	11.2	8.7	13.6	1.5	84.4
Dec	2.9	-0.1	5.9	0.4	85.4
Jan	3.9	1.2	6.6	113.0	88.4
Feb	4.6	2.0	7.2	2.0	83.8
Mar	8.8	5.6	12.0	40.5	64.6
Apr	12.0	8.9	15.1	42.0	74.2
May	16.8	12.8	20.8	61.5	72.1
June	21.0	17.0	25.0	22.8	72.9
July	23.5	26.0	21.0	30.0	75.0

Production quality indexes were determined in order to correlate the obtained production with crop quality (humidity and M HI).

RESULTS AND DISCUSSIONS

Results on phytosanitary status of winter crops are presented in Tables 2 and 3. Due to heavy rains in the entire vegetation period, the attack of pathogens that cause diseases was very aggressive, requiring the 3 pesticides treatments. It can be seen that all three treatments reduced the intensity of the attack. *Rhynchosporium secalis* and *Pyrenophora teres* on two-rowed barley and barley presented a

RA (attack rate) low (2-3%), except the variety Casanova (10.8%). In wheat, the pathogens *Septoria tritici* and *Pyrenophora graminis* showed attacks low (2-3%), except varieties Akrata (5%) Jinda (5%), Epos (7%) and Ewina (4.5%), with greater attack. *Puccinia striiformis* presented low levels of attack (1.5-2.5%), except the variety Andelka (5%). Data on yields obtained in experimental plots are shown in Table 3. In autumn two-rowed barley crops were obtained yields of 5600-6200 kg/ha. In barley crops, productions were between 5858 - 8000 kg/ha. The wheat productions ranged from 4250 to 7930 kg/ha. In terms of production quality indexes in most wheat crops were over 76.6 kg hectoliter mass.



Figure 1. Winter grain crops - observations in field

CONCLUSIONS

To prevent and control the pathogens that cause diseases in autumn cereal crops were necessary, in climatic conditions of the 2014 year, 3 treatments with fungicides. This has led to the absence of *Blumeria graminis* attack. Attack of *Rhynchosporium secalis* and *Pyrenophora teres* on two-rowed barley and barley showed a low degree of attack. In wheat, pathogens *Septoria tritici* and *Pyrenophora graminis* showed reduced attack degrees, as the pathogen *Puccinia striiformis*. The yields obtained in conditions of 2014 ranged between 5600-6200 kg/ha for two-rowed barley, between 5858-8000 kg/ha for barley and between 4250 to 7930 kg/ha for wheat. For all analyzed varieties, hectoliter weight was influenced by rainfall, showing values above 76.6 kg/hl.

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Table 2. Winter cereals phytosanitary status

Variety	<i>Rhynchosporium secalis</i>			<i>Pyrenophora teres</i>			<i>Pyrenophora graminis</i>		
	F (%)	I (%)	RA (%)	F (%)	I (%)	RA (%)	F (%)	I (%)	RA (%)
TWO-ROWED AUTUMN BARLEY									
Trasco	50	3	1.5	60	3	1.8	-	-	-
Metaxa	30	2	0.6	70	3	2.1	-	-	-
Malwinta	80	4	3.2	40	3	1.2	90	3	2.7
BARLEY									
Cristelle	70	3	2.1	60	4	2.4	60	7	4.2
Wendy	50	3	1.5	40	5	2.0	-	-	-
Antonella	30	2	0.6	50	3	1.5	-	-	-
Laverda	60	4	2.4	40	4	1.6	-	-	-
Scarpia	70	3	2.1	60	4	2.4	80	3	2.4
Henriette	60	8	4.8	-	-	-	70	6	4.2
Gerlach	80	2	1.6	-	-	-	70	8	5.6
Casanova	90	12	10.8	80	7	5.6	70	14	9.8
WHEAT									
Variety	<i>Septoria tritici.</i>			<i>Pyrenophora graminis</i>			<i>Puccinia striiformis</i>		
	F (%)	I (%)	RA (%)	F (%)	I (%)	RA (%)	F (%)	I (%)	RA (%)
Katarina	30	7	2.1	50	3	1.5	-	-	-
Ilinca	70	4	2.8	50	5	2.5	60	5	3.0
Andelka	50	5	2.5	60	5	3.0	50	10	5.0
Renata	20	5	1.0	30	5	1.5	-	-	-
Genius	60	3	1.8	50	7	3.5	40	5	2.0
Joker	30	5	1.5	40	5	2.0	-	-	-
Florian	30	2	0.6	20	5	1.0	30	8	2.4
Akratos	40	10	4.0	25	10	2.5	30	5	1.5
Hystar	30	3	0.9	20	5	1.0	-	-	-
Apache	50	3	1.5	60	8	4.8	-	-	-
Renan	60	8	4.8	70	10	7.0	-	-	-
Altigo	50	2	1.0	60	3	1.8	-	-	-
Jindra	50	10	5.0	40	5	2.0	-	-	-
Epos	70	10	7.0	80	3	2.4	-	-	-
Einstein	60	5	3.0	70	10	7.0	-	-	-
Ewina	50	9	4.5	70	8	5.6	-	-	-
Arkeos	50	3	1.5	60	10	6.0	50	5	2.5
Ingenio	50	8	4.0	60	9	5.4	-	-	-
Illico	70	5	3.5	60	7	4.2	-	-	-

Table 3. Technological sheet for winter crops

Variety	Seed norm (kg /ha)	Date of sowing	Emergence date	Number of plants in the emergence	Number of plants in the spring	Yield (kg / ha)	Quality index	
							U %	M HI (kg/hl)
TWO-ROWED AUTUMN BARLEY								
Trasco	160	16-Oct	28-29 oct	408	1320	5600		
Metaxa	160	16-Oct	28-29 oct	320	1188	6200		
Malwinta	160	16-Oct	28-29 oct	280	1104	5900		
BARLEY								
Cristelle	160	16-Oct	28-29 oct	268	960	7200		
Wendy	160	16-Oct	28-29 oct	400	1120	7500		
Antonella	160	16-Oct	28-29 oct	280	1000	6700		
Laverda	160	16-Oct	28-29 oct	280	1080	8000		
Scarpia	160	16-Oct	28-29 oct	268	1312	6270		
Henriette	160	16-Oct	28-29 oct	292	1120	7219		
Gerlach	160	16-Oct	28-29 oct	308	1240	5858		
Casanova	160	16-Oct	28-29 oct	332	1184	5858		
WHEAT								
Katarina	200	16-Oct	28-29 oct	520	928	7930	13	78
Ilinca	200	16-Oct	28-29 oct	422	828	7100	14.1	78
Genius	200	16-Oct	28-29 oct	504	1160	6313	13.8	78.5
Joker	200	16-Oct	28-29 oct	620	788	7000	14.2	78.7
Florian	200	16-Oct	28-29 oct	412	868	6600	13	77.7
Akratos	200	16-Oct	28-29 oct	448	812	4700	13.2	77.2
Hystar	80	16-Oct	28-29 oct	168	692	7100	13.2	73.6
Apache	180	16-Oct	28-29 oct	552	1172	5100	12.4	74.6
Renan	180	16-Oct	28-29 oct	460	1112	4300	13.4	76.6
Altigo	180	16-Oct	28-29 oct	320	1192	7200	13.4	74
Jindra	180	16-Oct	28-29 oct	480	800	5900	12.7	76.8
Epos	180	16-Oct	28-29 oct	560	852	4600	13	75.2
Einstein	180	16-Oct	28-29 oct	460	1132	5600	13.6	74.3
Evena	180	16-Oct	28-29 oct	480	816	5000	14.1	77.6
Arkeos	180	16-Oct	28-29 oct	540	732	4250	13.8	70.9
Ingenio	180	16-Oct	28-29 oct	400	828	7600	12.9	72.5
Illico	180	16-Oct	28-29 oct	520	660	7500	14.1	76.2

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