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RESISTANCE OF SOME COMMERCIAL WINTER WHEAT CULTIVARS TO *TILLETIA TRITICI*

ABSTRACT: This paper deals with the resistance of twenty commercial winter wheat cultivars to common bunt causal agent (*Tilletia tritici*). Significant differences among the cultivars concerning the infection percent were observed, as well as the differences in the level of commercial cultivars' resistance to *T. tritici*. Most of the studied cultivars belonged to susceptible categories, and just few of them to the resistant ones. Cultivar Lasta was classified as highly resistant during the both investigation years in Kragujevac, while in Leposavić Lasta and Tiha were classified as resistant. The other studied cultivars were more or less susceptible.

KEY WORDS: wheat, *Tilletia tritici*, common bunt, resistance, cultivar

INTRODUCTION

One of the earliest known wheat diseases is bunt, which is caused by various fungi species from genus *Tilletia*. The first report about the appearance of this disease in our country was published by Ranojević (1912). Until 1960, it was very frequent and harmful disease in Serbia (Kostić et al., 1966), and in the early '90s of the last century this almost forgotten disease massively appeared again (Stojanović et al., 1993, 1994; Jevtić et al., 1997a, 1997b). Thanks to the intensive seed disinfection it appears rarely (Matijević et al., 1994).

Among integral wheat protection measures against common bunt causal agent, creation resistant cultivars of and their growing could be of importance

(W i e s e, 1987). Thus, the aim of this research was to study the resistance of some important commercial winter wheat cultivars to *T. tritici* and to point out their importance.

MATERIAL AND METHODS

They studies were carried out in 2005 and 2006 at the experimental field of the Institute for Small Grains in Kragujevac, as well as in 2006 at the location Leposavić (Kosmet). Resistance of twenty commercial winter wheat cultivars to *T. tritici* was investigated. Overdose method was used for inoculation of hundred grains per each studied wheat cultivar, by application of dry teleutospores, after which excessive teleutospores were removed by sifting through a sifter. This method ensured the presence of over 60 000 teleutospores on each grain.

Sowing in Kragujevac was done on October 26, 2005 and October 15, 2006, and in Leposavić on October 28, 2006. Inoculated seeds were sown in consecutive rows, one cultivar per row. Row length was 1 m, and inter-row distance was 25 cm. Common agrotechnical measures for wheat were applied during the vegetation, and weed plants were destroyed mechanically.

In full ripening stage, spikes of the studied cultivars were cut off and their health status was investigated in the laboratory. Total number of both analysed and attacked spikes was evaluated.

A scale with values 0-IV was used for establishing the level of cultivars resistance to *T. tritici* (K r i y c e n k o and M j a g k o v a, 1977):

0 — highly resistant cultivar (every spike healthy);
I — resistant cultivar (number of affected spikes up to 10%);
II — medium resistant cultivar (number of affected spikes from 11 to 25%);
III — medium susceptible cultivar (number of affected spikes from 26 to 50%);
IV — highly susceptible cultivar (number of affected spikes over 50%).

RESULTS

On the basis of the data presented in Table 1, one can see that the average infection intensity in Kragujevac was 25.64% in 2005, and 70.62% in 2006, while in Leposavić it amounted to 51.06%. That points to better conditions for infection during the autumn 2005, in regard to 2004. The highest infection intensity in 2006 in Kragujevac was shown by susceptible cultivars Kraljevica (92.21%) and Evropa (90.48%), and in Leposavić by cultivar Evropa (95.71%).

Tab. 1 — Resistance of some commercial winter wheat cultivars to *Tilletia tritid*

Cultivar	2005.			2006.					
	Kragujevac			Kragujevac			Leposavić		
	I	II	III	I	II	III	I	II	III
Pobeda	86	11	12.79	82	72	87.80	26	17	65.38
Evropa	32	15	46.88	63	57	90.48	70	67	95.71
NS Rana 5	42	19	45.24	57	47	82.46	24	17	70.83
Lasta	31	0	0.00	63	0	0.00	49	4	8.16
Tiha	67	20	29.85	77	65	84.42	77	5	6.49
Balkan	56	8	14.29	78	60	76.92	66	39	59.09
KG-100	40	18	45.00	83	48	57.83	34	20	58.82
KG-56S	62	25	40.32	62	44	70.97	41	24	58.54
Vizija	18	4	22.22	69	43	62.32	56	32	57.14
Ana Morava	82	30	36.58	50	33	66.00	38	23	60.53
Kraljevica	59	20	33.90	77	71	92.21	9	4	44.44
Partizanka	24	1	4.17	61	39	63.93	70	41	58.57
Jugoslavija	44	11	25.00	93	69	74.19	17	5	29.41
Rodna	45	3	6.67	71	41	57.75	43	17	39.53
Kruna	45	17	37.78	83	71	85.54	97	70	72.16
PKB Krupna	31	7	22.58	83	63	75.90	36	22	61.11
Dejana	76	0	0.00	64	42	65.63	18	8	44.44
Danica	16	5	31.25	90	78	86.67	33	19	57.58
Toplica	75	26	34.67	99	65	65.66	27	8	29.63
Rana Niska	38	9	23.68	70	46	65.71	55	24	43.64
MEAN			25.64			70.62			51.06

I — number of analysed spikes; II — number of infected spikes; III — infection percent

The study results also point to the existence of significant differences in the infection percent of various cultivars, as well as to the different resistance level to *T. tritici* of the investigated commercial cultivars. Most of the studied cultivars belonged to susceptible categories (III and IV), and just few of them to the resistant ones (0, I and II).

Cultivar Lasta was the only one classified as highly resistant during the both investigation years in Kragujevac. In 2005 cultivar Dejana was highly resistant, cultivars Partizanka and Rodna belonged to the resistant category, while medium resistance was shown by cultivars Pobeda, Balkan, Vizija, Jugoslavija, PKB Krupna, and Rana Niska. At Leposavić location in 2006, only cultivars Lasta and Tiha were classified as resistant.

DISCUSSION

The obtained results show significant differences among cultivars regarding the infection percent, which points to their different resistance to *T. tritici*. Cultivar Lasta was highly resistant during the both investigation years in Kragujevac, as well as in Leposavić. Resistance of this cultivar, similar to that observed in this research, was pointed out in many previous reports (S t o j a n o v i ć et al., 1996, S t a l e t i ć et al., 2002, G u d ž i ć et al., 2006). Culti-

var Lasta has a satisfactory level of resistance to common bunt causal agent, which could be of importance for its spreading in the production, or using in the selection programmes as a gene donor. Peresipkin (1979) found that the mycelium *T. tritici* relatively easily, penetrates into shoot tissue, but in the heading stage it becomes disorganized in the resistant host cultivars, so most of the spikes remain without any visual disease symptoms.

A high number of susceptible cultivars was expected, regarding the fact that no organized selection for getting resistance to this pathogen was done in our country, which points to the necessity of creating new cultivars that would show, besides other positive production traits, a high resistance to *T. tritici*. When talking about wheat protection from common bunt, one ought to have in mind that this fungus has a large number of physiological races, each having a different virulency. Roderhiser and Holton (1937) reported the first data about the existence of *T. tritici* physiological races. Virulency structure of this pathogen is not known in our country.

Differences in the cultivar resistance level within years can be explained by different conditions for infection development, but it need not mean that this cultivar has factors of resistance (Staletić et al., 2002). In order to estimate active resistance of a cultivar, long term studies are neccessary.

Although an efficient wheat protection from common bunt can be achieved by fungicide application, future selection programmes for creation and growing resistant cultivars will enable a more efficient, ecologically clear, and cost effective wheat protection.

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ОТПОРНОСТ НЕКИХ КОМЕРЦИЈАЛНИХ СОРТИ ПШЕНИЦЕ ПРЕМА *TILLETIA TRITICI*

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Резиме

У раду је приказана отпорност двадесет комерцијалних сорти пшенице према проузроковачу главнице (*Tillecia tritici*). Утврђено је да постоје значајне разлике у проценту инфекције појединих сората, као и то да је отпорност комерцијалних сората пшенице према *T. tritici* различита. Већина испитиваних сората припадала је осетљивим, а мањи број отпорним категоријама. Врло отпорна у обе године проучавања у Крагујевцу била је сорта Ласта, а у локалитету Лепосавић у категорији отпорних биле су сорте Ласта и Тиха. Остале проучаване сорте су биле мање или више осетљиве.