

## CD 1252: HEALTH, QUALITY AND TOLERANCE TO PRE-HARVEST SPROUTING

### *CD 1252: SANIDADE, QUALIDADE E TOLERANCIA A GERMINAÇÃO*

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**ABSTRACT:** Resulting from the search for wheat cultivars with high yield potential, plant health, processing quality and tolerance to pre-harvest sprouting, CD 1252 was developed from the cross between cultivar IPR 85 and line OR1/3/BOW/GLENSON//BAGULA. Cultivar CD 1252 was tested in preliminary grain yield trials in 2005 and 2006, and then tested to determine the Value for Cultivation and Use (VCU) from 2007 to 2014, labelled CD 0711. All tests were arranged in an experimental design of randomized blocks, with three replications. The yield of cultivar CD 1252 was 5%, 4% and 1% higher than the average yield of the two best controls, respectively, in the wheat-growing regions VCU 2, 3 and 4. The wheat quality, potential for grain yield, and tolerance to pre-harvest sprouting of this cultivar are superior and it is tolerant to the main wheat diseases.

**KEYWORDS:** *Triticum aestivum* L. Diseases. Rain at harvest.

### INTRODUCTION

Wheat breeding programs have significantly improved grain yield and other relevant traits (KOHLI, 1998), of which the processing quality has come to be a key factor in recent decades in Brazil. Currently, wheat breeding programs in Brazil are focused on the improvement of grain yield potential, processing quality and disease resistance.

For Mandarin (1993), the quality requirements were decisive for some improvements in wheat breeding programs because, aside from the traditional selection criteria (increased yield, and resistance to diseases and toxic elements), the grain quality traits, that are relevant for food processing and industry, have to be taken into account in the development of new superior genotypes.

Quality maintenance at harvest is strongly related to tolerance to pre-harvest sprouting of a cultivar. Per Bassoi (2004), if rain falls before and during harvest, losses by germination are great, indicating the importance of using cultivars tolerant to pre-harvest sprouting in Brazil. To meet these essential prerequisites in the search for wheat lines with high quality, yield potential and pre-harvest sprouting tolerance, this study aimed to develop the CD 1252 cultivar.

### CONTENTS

The CD 1252 cultivar was derived from the cross between cultivar IPR 85 and line OR1/3/BOW/GLENSON//BAGULA, made by COODETEC in 1999, in Palotina, State of Paraná. The F<sub>1</sub> seeds were sown in November 1999, in a greenhouse in Cascavel, producing F<sub>2</sub> seeds. The F<sub>2</sub> population was grown in 2000, in Cascavel, applying the mass selection method. The F<sub>3</sub>, F<sub>4</sub> and F<sub>5</sub> populations were selected, respectively, in 2001, 2002 and 2003 by the pedigree method. In 2004, the F<sub>6</sub> population was also selected by the pedigree method and the plots with regular plants were harvested in bulk, resulting in multiple sister lines. The best of these lines originated cultivar CD 1252. The pedigree of this line is CC15212-0T-3P-4P-9P-0P.

The CD 1252 cultivar was included in the preliminary trials of grain yield in Cascavel and Palotina, in 2005 and 2006. For its performing better than the controls, it was evaluated in tests of Value for Cultivation and Use (VCU), from 2007 to 2014, under the acronym CD 0711. The VCU tests were carried out at representative locations of the wheat-growing regions (CUNHA et al., 2006). In the wheat-growing region 2, the VCU tests were conducted in Campo Mourão/PR, Cascavel/PR, Itapeva/SP, Itaberá/SP, and Taquarivaí/SP; in

wheat-growing region 3, in Arapongas/PR, Goioerê/PR, Palotina/PR, Rolândia/PR, Dourados/MS, Maracaju/MS, Ponta Porã/MS, Manduri/SP, Palmital/SP, and in Santa Cruz do Rio Pardo/SP; and in the wheat-growing region 4, the tests were performed in Catalão/GO, Cristalina/GO, Luziânia/GO, Paracatu/MG, and in São Gotardo/MG.

The experiment was arranged in a randomized block design, with three replications, in plots consisting of six 5-m-long rows, spaced 0.20 m apart. The fertilization and pest and disease control were applied as officially recommended (COMISSÃO, 2010). Prior to sowing, the seeds were treated with *triadimenol* and *imidacloprid*. The traits grain yield, days from emergence to heading, days from emergence to maturity, plant height,

lodging, hectoliter weight, 1000-grain weight, gluten strength, and yield stability were assessed. At strategic locations, the genotype collections used in the VCU tests were planted, in which the observed shoot diseases, i.e., leaf rust, leaf spot, powdery mildew, head blight, scab and wheat mosaic virus, among other diseases, were not controlled.

A comparison of the mean grain yield in the wheat-growing regions VCU 2, 3 and 4, respectively, showed that the grain yield of the CD 1252 cultivar exceeded the average of the two best controls by 5%, 4% and 1% (Table 1). Due to the excellent performance of cultivar CD 1252, it was indicated for cultivation in the above regions, corresponding to the States of Parana, Mato Grosso do Sul, São Paulo, Mato Grosso, Goiás, Minas Gerais, and the Federal District (BRASIL, 2015).

**Table 1.** Mean grain yield (kg ha<sup>-1</sup>) of cultivar CD 1252 and the two best controls, in the VCU tests conducted in the wheat-growing regions of VCU 2, 3 and 4 of the states of Paraná, São Paulo, Mato Grosso do Sul, Goiás and Minas Gerais, from 2007 to 2014 - Cascavel/2015.

Cultivar	2007	2008	2009	2010	2011	2012	2013	2014	Mean	%
<b>Wheat-growing region VCU 2</b>										
CD 1252	2931	4003	2677	4652	3696	3769	2878	5053	<b>3707</b>	<b>105</b>
T1*	3023	3764	2572	4156	3168	3920	2732	5418	<b>3669</b>	<b>104</b>
T2*	2559	3166	2504	3916	3258	3713	3014	5738	<b>3408</b>	<b>96</b>
Mean T	2791	3465	2538	4036	3213	3817	2873	5578	<b>3539</b>	<b>100</b>
<b>Wheat-growing region VCU 3</b>										
CD 1252	4166	3379	3193	2718	3461	2431	2332	2794	<b>3059</b>	<b>104</b>
T1*	3924	3457	3245	2678	3193	2481	2294	2974	<b>3045</b>	<b>103</b>
T2*	3610	3193	2853	2483	3199	2244	2429	2950	<b>2856</b>	<b>97</b>
Mean T	3767	3325	3049	2580	3196	2362	2362	2962	<b>2950</b>	<b>100</b>
<b>Wheat-growing region VCU 4</b>										
CD 1252	5345	5171	5023	5337	6042	5364	6379	5775	<b>5555</b>	<b>101</b>
T1*	5293	5137	4760	5301	5596	5121	6261	6002	<b>5434</b>	<b>98</b>
T2*	5328	4715	4752	5110	5900	5331	6523	6099	<b>5470</b>	<b>99</b>
Mean T	5311	5137	4756	5206	5748	5226	6392	6435	<b>5526</b>	<b>100</b>

\*In the wheat-growing region of VCU 2 and VCU 3, in 2007, 2008, 2009 and 2010, the controls T<sub>1</sub> and T<sub>2</sub> were, respectively, BRS 208 and IPR 85, in 2011 and 2012 respectively, BRS Pardela and BRS Guamirim, and in 2013 and 2014, BRS Pardela and Mirante. In the VCU Region 4, in 2007 and 2008, the controls T<sub>1</sub> and T<sub>2</sub> were, respectively, CD 108 and BRS 210, in 2009, 2010 and 2011, respectively, CD 108 and BRS 264, CD 108 and CD 150, in 2012, the controls T<sub>1</sub> and T<sub>2</sub> were, respectively, BRS 207 and BRS 264, and in 2013 and 2014 the controls T<sub>1</sub> and T<sub>2</sub> were, respectively, CD 150 and BRS 264.

The CD 1252 cultivar has a low average plant height (between 68-90 cm, mean of 75 cm). The cycle is average, lasting from 55 to 80 days from emergence to heading and 99 to 132 days from emergence to maturity (in the mean 66 and 116 days, respectively). CD 1252 has moderately resistant to lodging and to pre-harvest sprouting. In the means of the analysis of the processing quality of 32 samples from the tests in the different States, gluten strength was in the mean 340 W and stability 16.2 minutes, including CD 1252 in the extra strong wheat class.

In the experiments, carried out in the field from 2007 to 2014, data of several wheat diseases were recorded. CD 1252 was classified as moderately resistant to powdery mildew (*Blumeria graminis* f.sp. *tritici*), leaf spots (*Bipolares sorokiniana* and *Septoria tritici*), glume blotch (*Septoria nodorum*), leaf rust (*Puccinia triticina*), and wheat blast (*Pyricularia grisea*). In view of the high disease incidence, the cultivar was classified as susceptible to head blight (*Fusarium graminearum*). Cultivar CD 1252 is classified as extra strong wheat, has a high yield potential, tolerance to pre-harvest

sprouting and to the major wheat diseases. It represents a promising option for Brazilian wheat growers.

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**RESUMO:** Buscando cultivares de potencial produtivo, sanidade, qualidade industrial e tolerância a germinação na espiga, foi desenvolvida a cultivar de trigo CD 1252, obtida do cruzamento entre a cultivar IPR 85 e a linhagem OR 1/3/BOW/GLENSON//BAGULA. A cultivar CD 1252, participou dos Ensaio Preliminares de rendimento de grãos em 2005 e 2006, sendo em seguida testada em Ensaio de Valor de Cultivo e Uso (VCU), nos anos de 2007 a 2014, com a sigla CD 0711. Todos os ensaios foram conduzidos em delineamento experimental de blocos ao acaso, com três repetições. A cultivar CD 1252 apresentou rendimento 5%, 4% e 1% superior à média das duas melhores testemunhas, respectivamente, nas Regiões Trítcolas de VCU 2, 3 e 4. A referida cultivar tem qualidade superior (trigo melhorador), alto potencial de rendimento de grãos, tolerância à germinação na espiga e tolerância às principais doenças.

**PALAVRAS-CHAVE:** *Triticum aestivum* L. Doenças. Chuva na Colheita.

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