



CULTIVAR RELEASE

CD 150 - short wheat cultivar with high quality and high yield

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ABSTRACT - The industrial quality and lodging resistance of CD 150, a cross between CD104 and CD108, are high and the plant height is short. The average yield was 10 % higher than of the controls in the regions II, III and IV. It is suitable for cultivation in the states of PR, SP, MS and GO, MG, and DF.

Key words: strong gluten wheat; agronomic characteristics; recommendation for cultivation.

INTRODUCTION

Wheat is the most important winter crop in the region of the Southern Cone of South America (Kohli 1998). In Brazil, the region of cultivation is concentrated mainly in the states of Paraná and Rio Grande do Sul, where more than 80 % of the national production is grown (www.conab.gov.br/conabweb).

The focus of wheat breeding programs is basically potential yield, industrial quality, low plant height and disease resistance (Brunetta and Dotto 2000). Most breeding programs have achieved significant progress in grain yield and other important traits in wheat (Kohli 1998).

The wheat quality is measured by the hectoliter weight, gluten strength and falling number (Comissão Brasileira 2008). The grain storage proteins, protein content and hardness are the components that largely determine the bread quality (Dubcovsky et al. 1998). In wheat breeding, the quality must be considered as important as grain yield and disease resistance (Peña et al. 1997).

The cultivar CD 150, which is short, tolerant to major diseases, high yielding and has the grain quality of a strong gluten wheat was developed to meet the main requirements of the wheat sector.

IMPROVEMENT METHODS

The wheat CD 150 was derived from a manual cross between the cultivars CD 104 and CD 108 in Palotina, state of Paraná, in 1998. The populations F₁, F₂ and F₃ were conducted by the mass method in a greenhouse in Cascavel, Paraná. Populations F₄, F₅ and F₇ were grown on the field by the pedigree method, in Palotina. The traits were fixed in the F₈ generation, and one of the selected lines originated CD 150.

CHARACTERISTICS OF PERFORMANCE

Cultivar CD 150 (labeled CD 0559) was tested in the period from 2005 to 2008 in a randomized block design with three replications. The plots consisted of six 5-m-

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long rows, spaced 0.20 m apart, where wheat was sown mechanically. Fertilization was performed and pests and diseases were controlled according to the technical recommendations (Comissão Brasileira 2008). At some locations, plants grown without control of shoot diseases were sampled to assess the severity of leaf rust, leaf spots, powdery mildew and blast (Reis and Casa 2007).

The VCU was tested in different states (Table 1) in the wheat regions II, III and IV (Cunha et al. 2006). Data of agronomic traits, disease severity, industrial quality and yield were recorded (Tables 2 and 3). The mean grain yields were similar in all three regions, i.e., 11, 12 and 12 % higher than the control means, in the regions II, III and IV, respectively (Table 2). These percentages, based on the mean of four years of evaluation led to recommendations for cultivation in Paraná, São Paulo and Mato Grosso do Sul. CD 150 is also suitable for irrigated cultivation in Goiás and Minas Gerais, where the average grain yield was 5659 kg ha⁻¹.

The plant height of CD 150 is short, with an average height of 69 cm, ranging from 50 to 95 cm. The cycle is early, with an average of 62 days (between 55 and 81 days) from emergence to heading and a mean of 116 days (between 94 and 130 days) from emergence to maturity. These characteristics varied according to the climatic conditions, sowing date and soil type in each region. The mean percentage of lodging of CD 150 was 3 %, lower than of the control cultivars, classifying the cultivar as moderately tolerant to lodging.

The results of analysis of industrial quality, of 11 samples of experimentation in the different states,

generated average gluten strength (W) of 375 x 10⁻⁴ Joules, which allowed a classification of CD 150 cultivar as strong gluten wheat, with even better results than of other such wheat types released in Brazil, as CD 109 and CD 116 (Marchioro et al. 2004, Franco et al. 2009).

In the experiments between 2004 and 2008 the severity of diseases occurring in Brazil was graded (scale 0-9) (Table 3). The severity of powdery mildew (*Erysiphe graminis* f.sp. *tritici*) was determined based on the low average of 0.8, corresponding to lower values than of the two controls with lowest average grade. The average leaf spot rates for spot blotch (*Bipolaris sorokiniana*) and septoria (*Septoria tritici* and *S. Nodorum*) indicated the classification of a moderately susceptible cultivar. The average severity of leaf rust (*Puccinia recondita* f.sp. *Tritici*) was low (8 %) under field conditions, indicating moderate resistance of the cultivar.

The industrial quality of CD 150 was characterized as high, for being strong gluten wheat with agronomic type, low plant height and lodging resistance. The characteristics tolerance to blast and to leaf rust, the most common diseases in the cultivation regions, are also positive.

SEED PRODUCTION

The COODETEC located in BR 467, km 98, C.P. 301, 85.813-450, Cascavel, PR, Brazil, contracts seed companies to multiply and sell cultivars protected according to law No. 9456/97.

Table 1. Number of tests of Value for cultivation and Use (VCU) for cultivar CD 150 conducted per state, in the wheat regions VCU II, III and IV, between 2005 and 2008

State	Region VCU II				Region VCU III				Region VCU IV			
	2005	2006	2007	2008	2005	2006	2007	2008	2005	2006	2007	2008
Paraná	3	3	3	5	4	4	5	8				
São Paulo	-	1	1	1	-	1	1	1				
Mato Grosso do Sul					2	2	2					
Goiás									1	2	2	1
Minas Gerais									1	2	1	-

Table 2. Mean grain yield (kg ha⁻¹) of cultivar CD 150 and the mean of the two best controls, in the wheat regions VCU II, III and IV, between 2005 and 2008

Cultivar	Region	Years				Mean	(%)
		2005	2006	2007	2008		
CD 150	II	3066	4082	3317	4259	3681	111
Co. mean		2480	3990	3270	3501	3310	100
CD 150	III	3857	2804	3807	3537	3501	112
Co. mean		3087	2670	3567	3160	3121	100
CD 150	IV	6459	5418	5508	5251	5659	112
Co. mean		6017	5551	4687	4015	5068	100

* The controls in comparison (Co. mean) in the regions II and III (BRS 208, BRS 210, IPR 85 and ONIX) and in the region IV (BRS 207, BRS 210, EMBRAPA 42, ONIX) were used in the four test years.

Table 3. Means of days from emergence to heading (EH), days from emergence to maturity (EM), plant height (PH), lodging (LO), hectoliter weight (HW), 1000 grain weight (GW), general gluten strength (W), leaf rust (LR), leaf spot (LS), powdery mildew (PM) and blast (BS) of cultivar CD 150 and the controls, between 2005 and 2008

Cultivar	EH (days)	EM (days)	PH (cm)	LO (%)	HW (kg hL ⁻¹)	GW (g)	W (10 ⁻⁴ Joule)	LR (%)	LS (0-9)*	PM (0-9)*	BS (0-9)*
CD 150	62	116	69	3	79	37	375	8	2.3	0.8	1.0
BRS 208	62	117	86	23	78	36	280	1	1.3	2.1	3.4
IPR 85	59	113	79	27	79	41	390	5	2	1.3	1.9
ONIX	69	122	81	9	78	36	276	49	2.9	1.5	1.1

* Grades on a 0 - 9 scale.

REFERENCES

- Brunetta D and Dotto SR (2000) Trigo no Paraná: visão histórica, situação atual e perspectivas. In Cunha GR (ed.) **Trigo no Brasil rumo ao século XXI**. Embrapa Trigo, Passo Fundo, p. 129-135.
- Comissão Brasileira de pesquisa de trigo e triticale, 1 (2008) **Informações técnicas para a safra 2008: trigo e triticale**. Embrapa Soja, Londrina, 147p. (Documentos, 301)
- Cunha GR, Scheeren PL, Pires JLF, Maluf JRT, Pasinato A, Caierão E, Silva MS, Dotto SR, Campos LAC, Felício JC, Castro RL, Marchioro V, Riede CR, Rosa Filho O, Tonon VD and Svoboda LH (2006) **Regiões de adaptação para trigo no Brasil**. Embrapa Trigo, Passo Fundo, 35p. (Circular Técnica Online, 20)
- Dubcovsky J, Tranquilli G, Lijavetzky D, Khan IA, Schlatter AR, Manifesto MM and Marcucci-Poltri S (1998) Advances in molecular markers for bread making quality. In Kohli MM and Francis M (eds.) **Application of biotechnologies to wheat breeding**. Cimmyt-Inia, La Estanzuela, p. 57-68.
- Franco AF, Marchioro VS, Dalla Nora T, Schuster I, Oliveira EF, Vieira ESN and Lima FJA (2009) CD 116: A healthy wheat cultivar with industrial quality. **Crop Breeding and Applied Biotechnology 9**: 196-198.
- Kohli MM (1998) Use of biotechnology in wheat breeding in the southern cone region. In Kohli MM and Francis M (eds.) **Application of biotechnologies to wheat breeding**. Cimmyt-Inia, La Estanzuela, p. 1-15.
- Marchioro VS, Franco AF, Schuster I, Dalla Nora T, Oliveira EF and Sobrinho AA (2004) CD 109 - wheat cultivar. **Crop Breeding and Applied Biotechnology 4**:255-257.
- Peña RJ, Ortiz-Monasterio JI and Sayre KD (1997) Estrategias para mejorar (o mantener) la calidad panadera en trigo de alto potencial de rendimiento. In Kohli MM and Martino DL (eds.) **Explorando altos rendimientos de trigo**. Cimmyt-Inia, La Estanzuela, p. 289-306.
- Reis EM and Casa RT (2007) **Doenças dos cereais de inverno. Diagnóstico epidemiologia e controle**. Graphel, Lages, 176p.