



## CULTIVAR RELEASE

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### CD 122 - Bread wheat, suitable for cultivation across southern Brazil

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**Abstract** – The cultivar CD 122 was tested in the wheat-producing regions VCU 1, 2 and 3, with an average grain yield of 3,527 kg ha<sup>-1</sup> when fungicide-treated, exceeding the average of the control cultivars by 5%. CD 122 is resistant to leaf rust and was classified as bread wheat.

**Key words:** *Triticum aestivum L.*, breeding program, plant health, grain yield, baking quality.

#### INTRODUCTION

Increasing the yield potential is a constant target of wheat breeding programs, but aside from the yield potential, the wheat grain must also meet the quality standards of the milling industry, with specific requirements for the production of bread, pasta and cookies (Smanhotto et al. 2006). CD 122 is being released with the goal of providing a quality cultivar with high yield potential, suitable plant architecture, and good resistance to leaf rust.

The wheat quality has become increasingly important in recent years in Brazil, particularly for grain sale. To meet this demand, COODETEC developed the wheat cultivar CD 122, which has excellent processing quality in the cold and warm regions of southern Brazil. These cultivars joins the group of bread wheat cultivars for Rio Grande do Sul and Santa Catarina, along with the previously released cultivars for these regions, such as CD 114 and CD 117 (Marchioro et al. 2007, Marchioro et al. 2009).

#### BREEDING METHODS

Cultivar CD 122 was derived from the cross between the cultivars IPR 85 and BRS 229, at COODETEC, Palotina, in 1999. The F<sub>1</sub> seeds were sown in November of the same year, in a greenhouse in Cascavel, and at maturity all ears were bulk-collected and later threshed to extract the F<sub>2</sub> seeds. The F<sub>2</sub> generation was grown in a greenhouse in March 2000 in Cascavel, using mass selection. The F<sub>3</sub>, F<sub>4</sub>

and F<sub>5</sub> generations were selected in Palotina by the pedigree method. In 2003, the plots with uniform plants in the F<sub>6</sub> generation were bulk-harvested, originating several sibling lines. The best of these lines gave rise to cultivar CD 122 (pedigree CC15210-0T-2P-1P-4P-0P).

#### PERFORMANCE CHARACTERISTICS

Cultivar CD 122 participated in preliminary grain yield tests in 2004 and 2005, in Cascavel and Palotina, with better performance than of the controls. It was tested in VCU (Value for Cultivation and Use) tests at various locations and sowing times, in different states of Brazil, under the experimental name CD 0625, from 2006 until 2010. The VCU tests were conducted according to the wheat-growing regions (Embrapa Trigo 2006), at the following locations: VCU wheat region 1 – Guarapuava, Castro, Campos Novos, Não-Me-Toque, Cruz Alta, Lagoa Vermelha, and Vacaria; VCU wheat region 2 – in Cascavel, Campo Mourão, Abelardo Luz, Santo Augusto, Santa Rosa, São Luiz Gonzaga, and Cachoeira do Sul; VCU wheat region 3 – in Palotina, Arapongas and Goioerê. The locations were not the same in all years; the number of locations per region, in each evaluation year, is shown in Table 1.

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 and mechanically sown. Fertilization and pest and disease control were applied

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as recommended for the crop (Reunião 2008). The seeds were treated with Triadimenol + Imidacloprid before sowing. The variables assessed in the VCU trials were: grain yield, obtained by weighing the total harvest of the plot, corrected to 13% grain moisture and transformed to kg ha<sup>-1</sup>; days from emergence to heading by counting the number of days; days from emergence to maturity, by counting the number of days; plant height, by measuring the plants from the ground to the tip of the ears excluding awns; lodging, as percentage of lodged plants; hectoliter weight, by weighing a sample of known size and projection to 100L; 1000-grain weight - by counting and weighing 1000 grains; gluten strength and tenacity/extensibility ratio, by the alveograph test. At a smaller number of locations (Table 3) the same group of genotypes that constituted the VCU tests was assessed. To these groups, no disease control was applied for disease evaluation. The leaf rust diseases were assessed by computing the percentage of pustule incidence on the flag leaf while leaf spots, powdery mildew, head blight, wheat mosaic virus, and leaf blast were evaluated on a 0-9 scale of incidence, where 9 is the highest incidence.

The mean grain yield of cultivar CD 122 in the VCU

wheat regions 1, 2 and 3 (Table 2) was 4 %, 6 % and 6 % higher than the average of the two best controls, respectively. Due to the good performance of cultivar CD 122, it was indicated for cultivation in the above wheat regions, in the States of Rio Grande do Sul, Santa Catarina and Paraná.

Cultivar CD 122 has a high potential for grain yield and good resistance to leaf rust, representing a promising alternative for wheat producers interested in quality bread wheat cultivars in southern Brazil. CD 122 was registered in 2010 by the National Service of Plant Protection of the Ministry of Agriculture (Brazil 2010).

## OTHER FEATURES

The plant height of cultivar CD 123, with 60 to 95 cm, is low, and the average cycle lasts 61 to 87 days from emergence to heading and 104 to 146 days from emergence to maturity. In the mean, these characteristics were 75 cm, 74 days and 122 days, respectively, and varied according to the weather conditions, sowing date and soil type. The CD 122 has fusiform ears, is moderately resistant to lodging, has a curved position and is moderately resistant to moderately

**Table 1.** Number of tests of Value for Cultivation and Use (VCU) per State with cultivar CD 122, in the VCU wheat regions 1, 2 and 3, from 2006 to 2010

State*	Region VCU 1					Region VCU 2					Region VCU 3		
	2006	2007	2008	2009	2010	2006	2007	2008	2009	2010	2008	2009	2010
PR	3	4	4	4	4	3	3	3	3	5	2	2	6
SC	-	1	1	1	1	-	1	2	2	2	-	-	-
RS	-	3	4	3	2	1	3	3	3	3	-	-	-

\* VCU tests were carried out in: Guarapuava, Castro, Campos Novos, Nã-Me-Toque, Cruz Alta, Lagoa Vermelha, Vacaria, Cascavel, Campo Mourão, Abelardo Luz, Santo Augusto, Santa Rosa, São Luiz Gonzaga, Cachoeira do Sul, Palotina, Arapongas, and Goioerê.

**Table 2.** Mean grain yield (kg ha<sup>-1</sup>) of cultivar CD 122 and the two best controls, under fungicide application, in the VCU wheat regions 1, 2 and 3, from 2006 to 2010

Region	Cultivar	2006	2007	2008	2009	2010	Mean	%
VCU 1	CD 122	3824	3608	3956	3674	4290	3870	104
	Mean T*	3734	3372	3889	3585	4065	3729	100
VCU 2	CD 122	3379	3488	3238	3151	4126	3476	106
	Mean T*	3215	3132	3160	3030	3882	3284	100
VCU 3	CD 122	-	-	2722	3464	3516	3234	106
	Mean T*	-	-	2734	3238	3209	3060	100

\* The controls used in the comparison were ONIX and SAFIRA in the VCU wheat regions 1 and 2 and BRS 208 and BRS Guamirim in the VCU wheat region 3.

**Table 3.** Means of days from emergence to heading (HD), days from emergence to maturity (MT), plant height (PH), lodging (LO), hectoliter weight (HW), 1000-grain weight (ThG), gluten strength (W), leaf rust (LF), leaf spot (LS), powdery mildew (PM), head blight (HB), wheat mosaic virus (MV) and blast (BS) of cultivar CD 122 and control ONIX, from 2006 to 2010

Cultivar*	EH (days)	EM (days)	PH (cm)	LO (%)	HW (kg hl <sup>-1</sup> )	WS (g)	GW (10 <sup>-4</sup> Joule)	P/L (ratio)	LF (%)	LS (nta 0-9)	PM (nta 0-9)	HB (nta 0-9)	MV (nta 0-9)	BS (nta 0-9)
CD 122	74	122	75	12	77	35	260	0.7	9	2.6	1.6	3.2	2.0	0.8
ONIX	74	127	82	8	77	36	240	1.5	48	3.5	1.9	3.0	2.0	0.9

\* Results from VCU tests at the following locations: Guarapuava, Castro, Campos Novos, Nã-Me-Toque, Cruz Alta, Lagoa Vermelha, Vacaria, Cascavel, Campo Mourão, Abelardo Luz, Santo Augusto, Santa Rosa, São Luiz Gonzaga, Cachoeira do Sul, Palotina, Arapongas, and Goioerê, except for data of disease response, which were assessed in genotype groups in VCU tests in Guarapuava, Nã-Me-Toque, Cascavel, Campo Mourão, Abelardo Luz, Santo Augusto, and Palotina.

susceptible to pre-harvest sprouting. In the milling quality analysis of 9 samples from experiments in the different States, an average gluten strength of 260 W was evaluated, which allows the classification in the group of bread wheat cultivars (Table 3).

In the field experiments from 2004 to 2010, disease grades were attributed to cultivar CD 122. The severity of leaf rust (*Puccinia triticina*) was low under field conditions, indicating that the cultivar is moderately resistant. For helminthosporiosis (*Bipolar sorokiniana*) and septoria diseases (*Septoria tritici* and *Stagonospora nodorum*), mean severity indices of leaf spot and glume spot were found, which classified the cultivar as moderately susceptible. In the evaluation of powdery mildew (*Blumeria graminis* f.sp.

*tritici*), low severity was observed, corresponding to the classification moderately resistant. To head blight (*Fusarium graminearum*), a medium to high severity response was recorded, classifying the cultivar as moderately susceptible. To wheat mosaic virus the cultivar responded with moderate susceptibility and to blast (*Pyricularia grisea*) with moderate resistance (Table 3).

## BASIC SEED PRODUCTION

Seed companies are licensed by COODETEC (located at BR 467, km 98, PO Box 301, 85.813-450, Cascavel, PR, Brazil), under Law No. 9456/97, for seed production and sale of the protected cultivars to grain farmers.

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