

## CD 115: Soft Wheat Cultivar for colder regions

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**ABSTRACT** – *The cultivar CD 115 was developed by the Cooperativa Central de Pesquisa Agrícola (COODETEC) and is recommended for cultivation in the states of Rio Grande do Sul, Santa Catarina and Paraná. The cultivar is tolerant to diseases and pre-harvest sprouting. The mean grain yield in four years of evaluation was 3,420 kg ha<sup>-1</sup>, exceeding the controls by 7%.*

**Key words:** genetic improvement, grain yield, pre-harvest sprouting.

### INTRODUCTION

The purpose of plant breeding is to create variability and to select and evaluate desirable genotypes in different environments for adjustments that would allow a maximum use of the genetic potential (Carvalho et al. 2003). Aiming at the development of cultivars adapted to different wheat regions of Brazil and the neighboring countries, the COODETEC is testing hundreds of lines in different environments every year in search for cultivars with a higher grain yield, industrial quality, higher tolerance to ear germination, disease, drought, aluminum-toxic soils, natural threshing and lodging and with a higher tillering capacity, fertilization response, wide adaptation and grain yield stability. The new wheat cultivar CD 115 meets some of these requirements; it has a higher grain

yield compared to the controls used and a greater tolerance to diseases and pré-harvest sprouting.

### PEDIGREE AND IMPROVEMENT METHODS

Cultivar CD 115 was derived from the cross between genotype OC 926 and a line obtained from a cross between the genotypes OCEPAR 7 - Bataúfra and PG 868, by manual artificial crossing in 1994. F<sub>1</sub> seeds were sown in a greenhouse in the same year, in Cascavel. The F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub> populations were conducted by the modified bulk method, i.e., the best plants of a plot in the field are selected and the mixed seeds of these plants used to grow the next generation. The F<sub>5</sub> and F<sub>6</sub> populations were conducted by the pedigree method, i.e., plants and seeds from each selected plant are used individually to obtain new populations in the following

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generation. In the F<sub>6</sub> generation, several stable lines were obtained and one originated the new wheat cultivar CD 115 with the pedigree CO13660-00T-00T-6T-4T-0T.

## PERFORMANCE

After the selection process, cultivar CD 115 was tested in preliminary trials in Cascavel and Palotina, in 2000 and 2001, where the performance was better than of the controls. In 2002, it was included in the network of experimentation under the experimental name CD 200224. Trials were also conducted in adaptation regions in the states of Parana (PR), Rio Grande do Sul (RS) and Santa Catarina (SC) in 2002, 2003, 2004 and 2005. In RS the tests were conducted in Santa Rosa, São Luiz Gonzaga, Santo Augusto, Não-Me-Toque, Cruz Alta and Lagoa Vermelha; in SC in Campos Novos, Campo Belo do Sul, Abelardo Luz and Chapecó; and in PR in Cascavel, Palotina, Campo Mourão, Castro, Guarapuava, and in Mariópolis. The experiments were set up in a random block design, with three replications, in plots of 6 rows, 5 m long, spaced 0.20 m apart, with mechanical sowing. Fertilization and pest and disease control were carried out according to the technical

recommendations. Prior to sowing the seeds were treated with Triadimenol + Imidacloprid. In these tests with pest and disease control of the shoot, data of grain yield, days from emergence to heading, days from emergence to maturity, plant height, lodging, hectoliter weight, weight of a thousand grains and gluten strength were measured. A collection of genotypes was also grown, which were tested without pest and disease control on shoots, where data of leaf rust, leaf spot, powdery mildew and wheat mosaic virus were obtained, among others. The mean grain yield of CD 115 in the adaptation regions 1, 2 and 3 in RS was higher by 6%, 10% and 4% than the control mean, respectively (Table 1). In the regions 4 and 5 in SC, the grain yield was 6% and 9% higher than the control mean, respectively. In the regions 7 and 8 of PR the grain yield was 5% above the control mean in both regions. In general, the mean grain yield of the new cultivar was by 7% higher than the control mean. In view of the good performance, cultivar CD 115 was indicated for cultivation in all cited regions (Commission 2005) and included in the Registro Nacional de Cultivares do Ministério da Agricultura, certificate number 00865, on March 07, 2006 (Brazil 2007).

**Table 1.** Means of grain yield (kg ha<sup>-1</sup>) of cultivar CD 115 and the mean of the controls (C), in the regions 1, 2 and 3 in the state of Rio Grande do Sul, regions 4 and 5 in the state of Santa Catarina and regions 7 and 8 in the state of Paraná, in the period from 2002 to 2005

Cultivar	State	Region	2002	2003	2004	2005	Mean	%
CD 115	RS	1	-	-	4576	2632	3604	106
Mean (C)			-	-	4163	2561	3362	100
CD 115	RS	2	2205	3454	2243	3667	2892	110
Mean (C)			2013	3324	2087	3053	2619	100
CD 115	RS	3	1729	3674	3329	3399	3033	104
Mean (C)			1757	3436	3344	3035	2893	100
CD 115	SC	4	3144	4744	3154	2752	3449	106
Mean (C)			2956	3818	3389	2711	3219	100
CD 115	SC	5	3743	3192	4266	4622	3956	109
Mean (C)			2808	3035	4260	4676	3695	100
CD 115	PR	7	2582	3094	2358	2462	2624	105
Mean (C)			2362	2924	2304	2420	2503	100
CD 115	PR	8	3947	4937	4275	-	4386	105
Mean (C)			3727	4691	4114	-	4177	100
CD 115	MEAN		2892	3849	3457	3256	3420	107
Mean (C)			2604	3538	3380	3076	3210	100

\*The controls were CEP 24 and FUNDACEP 27 in 2002; CEP 24, FUNDACEP 27, BRS 179 and ONIX in 2003; CEP 24, BRS 179 and ONIX in 2004; and, BRS 179, ONIX and SAFIRA in 2005.

## OTHER TRAITS

The plant height CD 115 is medium, ranging from 65 to 100 cm, and the cycle is intermediate, ranging from 59 to 88 days from emergence to heading and from 101 to 140 days from emergence to maturity. The mean of these traits was 81 cm, 75 days and 131 days, respectively, which vary according to weather conditions, sowing date and soil type. The cultivar CD 115 is moderately susceptible to lodging, moderately resistant to in-ear-germination and moderately tolerant to aluminum toxic soil. In the industrial quality analysis, with 11 test samples, a mean gluten strength (W) of 111 ranked cultivar CD 115 as soft wheat (Table 2). In the field experiments, conducted from 2000 to 2005, information on different diseases in Brazil was recorded. The severity of powdery mildew (*Blumeria graminis* f.sp. *tritici*) was ranked as medium to low severity, which corresponded to the characterization of moderately susceptible. Against head blight (*Fusarium*

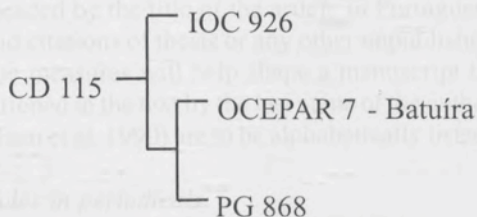
*graminearum*), the cultivar was moderately susceptible to helminthosporiose (*Bipolares sorokiniana*) and septorioses (*Septoria tritici* and *Stagonospora nodorum*). Severity indices of leaf spot and gluma stain were determined, which classified the cultivar as moderately resistant. The mean severity of leaf rust (*Puccinia triticina*) was low in field evaluations, indicating that the cultivar is moderately resistant. For wheat mosaic virus the cultivar was rated moderately resistant (Table 2).

## SEED MAINTENANCE AND DISTRIBUTION

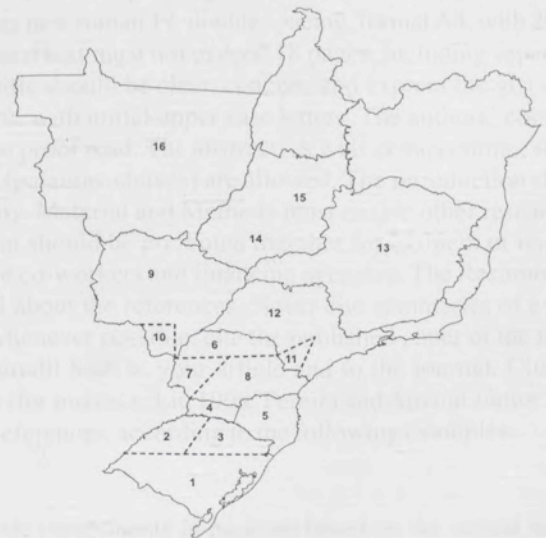
The COODETEC (BR 467 - km 98 - PO Box 301 - CEP.85813-450 - Cascavel/PR, Brazil), awards the license of the cultivars protected according to Law no. 9456/97 so that the seed companies multiply and sell them under contract. Besides, regional representatives supervised by a specific management work in the seed marketing and distribution.

**Table 2.** Data of cultivar CD 115 and the control CEP 24: mean number of days from emergence to flowering (EF), days from emergence to maturity (EM), plant height (PH), lodging (LO), hectoliter weight (HW), weight of a thousand grains (WG), gluten strength (W), leaf rust (LR), leaf spot (LS), powdery mildew (PM) and wheat mosaic virus (MV)

Cultivar	EF (days)	EM (days)	PH (cm)	LO (%)	HW (Kg hl <sup>-1</sup> )	WG (g)	W (10 <sup>4</sup> J)	LR (%)	LS (nta 0-9)	PM (nta 0-9)	MV (nta 0-9)
CD 115	70	121	79	12	78	32	111	3,7	2.1	2.2	2.0
CEP24	71	123	98	33	77	39	248	11.0	1.3	1.3	5.0



**Figure 1.** Pedigree of cultivar CD 115



**Figure 2.** Adaptation regions of trials of Value for Cultivation and Use (VCU)

REFERENCES

Brasil, Ministério da Agricultura, Pecuária e Abastecimento (2008) **Serviço nacional de proteção de cultivares**. Brasília, <http://www.agricultura.gov.br/sarc/dfpv/1st1200.htm>.

Carvalho FIF, Lorencetti C, Marchioro VS and Silva SA (2003) **Condução de populações no melhoramento genético de plantas**. Editora e Gráfica Universitária - UFPel, Pelotas. 230p.

Comissão Brasileira de Pesquisa de Trigo (2007) **Indicações técnicas para a safra 2008: trigo e triticale**. Embrapa Soja, Londrina, 147p.

Cultivar	IP	EM	PI	LD	HW	WD	W	IS	IS	IM	IM
	(days)	(days)	(cm)	°	(kg/m <sup>3</sup> )	(g)	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )
CD115	131	121	30	12	72	32	111	37	18	114	182
CD114	129	120	30	12	72	30	108	35	18	112	180



Figure 1. Geographical distribution of wheat and triticale cultivars in Brazil.