

CULTIVAR RELEASE

CD 121 - Cultivar with flour characteristics for cookie baking

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Abstract - CD 121 is indicated for wheat regions with the classification Value for Cultivation and Use 1 and 2, in the states of PR, SC and RS. The cultivar is tolerant to leaf rust, has good agronomic traits, flour suited for cookie baking and an average grain yield of 3.622 kg ha⁻¹.

Key words: Breeding program, flour for cookies, grain yield.

INTRODUCTION

Research on wheat in Brazil has been directed towards the development of wheat cultivars that meet different requirements such as high yield potential, processing quality and disease resistance, among others. The development of new cultivars that meet the demand of a genetic potential for higher yield is the main goal of any breeding program (Carvalho et al. 2008).

The processing quality at the time of wheat sale has gained importance and the value of certain cultivars can be improved for this trait. The cultivar determines the industrial quality of wheat, but according to Mandarino (1993), the interaction of the cultivar with the environment has a direct influence on the quality composition of the harvested grain. For flour suited for cookie baking, the Cooperative of Agricultural Research (COODETEC) maintains the cultivars CD 105, CD 115, CD 119, and CD 120 on the market (Marchioro et al. 2008, Franco et al. 2010, Marchioro et al. 2011). To expand the range of options, COODETEC developed the wheat cultivar CD 121 with excellent quality stability, which is an essential feature for flour production for cookie baking.

BREEDING METHODS

Cultivar CD 121 was derived from a cross between line ORL 95688 and cultivar CD 116 by COODETEC in 2000, in Palotina. The F₁ seeds were sown in November of the

same year, 2000, in a greenhouse in Cascavel, and all ears were harvested in bulk at maturity and threshed to obtain F₂ seeds. The F₂ population was grown in a greenhouse in March 2001, in Cascavel, and selected by mass selection. The F₃, F₄ and F₅ generations were grown in Guarapuava and selected by the pedigree method. In 2004, the plots with uniform plants in the F₆ generation were harvested in bulk, resulting in several sister lines. The best of these lines generated cultivar CD 121. The pedigree of this line was CC15710-0T-8G-3G-2G-0G.

PERFORMANCE CHARACTERISTICS

The selected line was tested in Preliminary Tests in 2005 and was included in the test for VCU (Value for Cultivation and Use) in 2006, under the experimental name CD 0684. These VCU tests were conducted in the states of Rio Grande do Sul, Santa Catarina and Paraná, covering the wheat regions VCU 1 and 2 (Embrapa Trigo 2006) (Table 1).

The experiment was arranged in a randomized block design with three replications in plots consisting of six 5-m rows, spaced 0.20 m apart, with mechanical sowing. Fertilization and pest and disease control were performed according to the technical recommendations (Reunião 2008). Prior to sowing, the seeds were treated with Triadimenol + Imidacloprid. The plants were assessed for grain yield, days from emergence to silking, days from emergence to maturity, plant height, lodging, test weight,

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1000-grain weight, and gluten strength. The genotypes of the VCU tests were collected at strategic locations and were not treated to control shoot diseases, e.g., leaf rust, leaf spot, powdery mildew, scab, and wheat mosaic virus (Reis e Casa 2007).

The mean grain yield of the wheat regions VCU 1 and 2 (Table 2) showed that the yield of cultivar CD 121 was 7% higher than the average of the two best controls in both regions. In view of the good performance of CD 121, the cultivar was indicated for the above regions, including the states of Rio Grande do Sul, Santa Catarina and part of Paraná and São Paulo and registered by the National Plant Variety Protection (SNPC), Ministry of Agriculture (Brasil 2010).

OTHER TRAITS

Cultivar CD 121 has a low plant height (54 - 88 cm) and the cycle length is average (61 - 85 days from emergence to silking and 106-147 days from emergence to maturity). The means of these traits were 75 cm, 75 days and 126 days, respectively, which varied according to the climatic conditions, sowing date and soil type. Cultivar CD 121 has fusiform ears, is moderately lodging resistant and moderately susceptible to sprouting. The analysis of processing quality of nine samples from the different states showed an average gluten strength (W) of 162, classifying CD 121 in the group of soft wheat cultivars (Table 3).

Disease scores were obtained in the field experiments from 2005 to 2009. The evaluations for powdery mildew (*Blumeria graminis* f.sp. *tritici*) showed low disease severity, indicating moderate resistance. The severity of head blight (*Fusarium graminearum*) was medium to high, classifying the cultivar as moderately susceptible. For helminthosporiosis (*Bipolares sorokiniana*) and septorioses (*Septoria tritici* and *Stagonospora nodorum*), the average severity rates of leaf and glume spot were observed, which classified the cultivar as moderately susceptible. Leaf rust (*Puccinia triticina*) severity was low in the field, indicating that the cultivar is moderately resistant. With regard to wheat mosaic virus, the cultivar was classified as moderately resistant (Table 3).

In the DUS tests (for distinctness, uniformity and stability), it was found that cultivar CD 121 has a semi-erect to erect growth habit and average plant height; recurved flag leaf, high waxiness of flag leaf sheath, colorless auricles; high stem waxiness, mean wall thickness and average diameter; fusiform, half-long, dense, light-colored and awned ears; glabrous, mid-long and wide glume, sloping to straight glume shoulder and mid-long teeth; and oval, mid-long, red semi-hard grains.

BASIC SEED PRODUCTION

The COODETEC (BR 467, km 98, PO Box 301, 85.813-450, Cascavel, PR, Brazil), can grant seed companies a license to multiply and sell seeds of protected cultivars to grain producers, according to law n° 9456/97.

Table 1. Number of VCU (Value for Cultivation and Use) tests carried out per state with cultivar CD 121, in the wheat regions VCU 1 and 2, from 2006 to 2009 - Cascavel/2010

State	Region VCU 1				Region VCU 2			
	2006	2007	2008	2009	2006	2007	2008	2009
Paraná	3	4	4	4	3	3	3	3
Santa Catarina	-	1	1	1	-	1	2	2
Rio Grande do Sul	-	3	4	3	1	3	3	3

Table 2. Mean grain yield (kg ha⁻¹) of cultivar CD 121 and of the two best controls in the wheat regions VCU 1 and 2, from 2006 to 2009 - Cascavel/2010

Region	Cultivar	2006	2007	2008	2009	Mean	%
VCU 1	CD 121	4228	3493	4151	3738	3903	107
	Mean T	3734	3372	3889	3585	3645	100
VCU 2	CD 121	3334	3312	3451	3266	3341	107
	Mean T	3215	3132	3160	3030	3134	100

* * The two best controls for comparison were ONIX and SAPPHERE, in both regions.

Table 3. Means of days from emergence to silking (ES), days from emergence to maturity (EM), plant height (PH), lodging (LO), test weight (TW), general gluten strength (W), tenacity/extensibility ratio (P/L), leaf rust (LR), leaf spot (LS), powdery mildew (PM), blight (BL) and wheat mosaic virus cultivar (MV) of cultivar CD 121 and control ONIX, from 2006 to 2009 - Cascavel/2010

Cultivar	ES (days)	EM (days)	PH (cm)	LO (%)	TW (kg hl ⁻¹)	W (10 ⁻⁴ Joule)	P/L (ratio)	LR (%)	LS (score 0-9)	PM (score 0-9)	BL (score 0-9)	MV (score 0-9)
CD 121	75	126	75	6	77	162	0.7	5	2.8	1.1	3.4	1.5
ONIX	74	127	82	8	77	240	1.5	48	3.5	1.9	3.0	2.0

REFERENCES

- Brasil. Ministério da Agricultura, Pecuária e Abastecimento (2010) **Serviço nacional de proteção de cultivares**. Brasília, <http://www.agricultura.gov.br/sarc/dfpv/lst1200.htm>.
- Carvalho FIF, Lorencetti C, Marchioro VS and Silva SA (2008) **Condução de populações no melhoramento genético de plantas**. Universitária, Pelotas, 288p.
- Embrapa Trigo (2006) **Regiões de adaptação para trigo no Brasil**. Embrapa, Passo Fundo, 35p. (Circular Técnica, 20)
- Franco AF, Marchioro VS, Dalla Nora T, Schuster I, Oliveira EF and Lima FJA (2010) CD 119: a wheat cultivar for cold subtropical regions. **Crop Breeding and Applied Biotechnology 11**: 375-378.
- Mandarino JMG (1993) **Aspectos importantes para a qualidade do trigo**. Embrapa Soja, Londrina, 32p. (Documentos, 60)
- Marchioro VS, Franco AF, Dalla Nora T and Oliveira EF (2008) CD 115: Soft wheat cultivar for colder regions. **Crop Breeding and Applied Biotechnology 8**: 255-258.
- Marchioro VS, Franco AF, Dalla Nora T, Oliveira EF, Schuster I, Evangelista A, Rocha R and Polo M (2011) CD 120 – wheat cultivar, standard quality soft, for the Southern Region of Brazil. **Crop Breeding and Applied Biotechnology 8**: 375-378.
- Reis EM and Casa RT (2007) **Doenças dos cereais de inverno: Diagnóstico, epidemiologia e controle**. Graphel, Lages, 176p.
- Reunião da comissão brasileira de pesquisa de trigo e triticales, 1. (2008) **Informações técnicas para a safra 2008: trigo e triticales**. Embrapa Soja, Londrina, 147p. (Documentos, 301).