

BRS Serrano – Rye cultivar

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Abstract - Rye cultivar BRS Serrano was developed by Embrapa. It resulted from a cross between the rye populations Garcia and Bagé. BRS Serrano attains high dry matter yield as forage plant and high grain yields.

Key words: *Secale cereale*, forage plant, crop breeding.

INTRODUCTION

Rye (*Secale cereale* L.) is a highly robust cross-pollinated species that adapts well to poor soils. It can be used for forage as well as grain production (Baier 1994). Among world cereals, it ranks eighth in terms of cultivated area. In Brazil, according to Baier (1994), the area dwindled away over the last five decades, probably in the aftermath of the extinction of colonial rye mills, cutbacks in research, disease incidence and government subsidies for wheat. In 2003, approximately 2,600 ha were cultivated in the country, while 57,000 ha were sown in Argentina. Mean yields in Brazil attain about 1.3 t ha⁻¹ (FAO 2004) and the state with largest cultivation area is Rio Grande do Sul (Embrapa 2005).

The genetic improvement of rye of Embrapa aims at developing cultivars with a higher biomass content and a better reaction against the main diseases for commercial plantations and interspecific crosses to develop new triticales cultivars.

PEDIGREE AND IMPROVEMENT METHOD

BRS Serrano was derived from the cross between

the rye populations ‘Garcia’ and ‘Bagé’, in 1998, by Embrapa Wheat, in Passo Fundo.

Seeds from the Embrapa wheat genebank were sown in 1998, in Passo Fundo, in order to evaluate the diversity of colonial rye populations for agronomic traits and forage performance. These populations had been collected over the course of the 30 years of existence of Embrapa Wheat with the main objective of characterizing and conserving germplasm of this cereal found in Brazil. These evaluations identified the populations denominated ‘Garcia’ and ‘Bagé’, collected in Passo Fundo (1980) and Veranópolis (1982), respectively, as outstanding in view of the potential as forage. In 1999, these two populations were mixed for cross-pollination and harvested in bulk. After three cycles of open pollination, the rye population BRS Serrano was established, initially designated BR 3 – Forrageiro and, later, PFS 3 and PFS 203. During 2000 and 2001 the population was multiplied. The genotype was tested in trials of Value of Cultivation and Use (VCU) in 2002, 2003 and 2004. In the same period, BRS Serrano was tested for Distinctness, Uniformity and Stability (DUS), to meet the requirements for indexation and protection.

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PERFORMANCE

As part of the VCU trial, the BRS Serrano was evaluated in seven environments, different in altitude, latitude, soil type and sowing date, to obtain more information on the agronomic performance. The experiments were conducted without fungicide treatment, with conventional fertilization according to soil analysis and crop recommendations and cut by hand for forage evaluation (Tables 1 and 2).

In the VCU trials, BRS Serrano outmatched the control BR 1 in dry matter yield for forage by 61% in Rio Grande do Sul, by 46% in Paraná, 50.5% in Mato Grosso do Sul, and 61.6% in São Paulo, resulting in a positive differential of 52% in the general mean (Table 1). In Vacaria, Campo Mourão and Manduri the forage productivity exceeded 5 t.ha⁻¹, demonstrating potential

and suitability. Regarding the use of the cultivar for the double aim (production of forage + grains), BRS Serrano presented superior performance to control BR 1, exceeding yields by 1% for one and 35% for two cuts (Table 2). Regrowth capacity and the later cycle account for a better performance at a higher number of cuts.

Owing to the performance of the cultivar, BRS Serrano was indexed for commercialization in all wheat regions of the south and central south of Brazil.

OTHER TRAITS

BRS Serrano is diploid and has tall plants, 160 cm in the mean of the evaluation trials. The growth habit is intermediate to semi-prostrate and later than cultivar BR 1, in heading as well as maturation. The complete cycle lasts around 160 days, 15 more than cultivar BR 1,

Table 1. Yield means of forage dry matter (kg ha⁻¹) of the rye cultivar BRS Serrano in comparison with BR 1, in 2004

Location	State	Altitude (m)	BR 1	BRS Serrano	Differential (%)	C.V. (%)
Passo Fundo	RS	687	2,810	2,348	83,6	10,69
Vacaria	RS	971	1,988	6,019	302,8	18,53
São Borja	RS	123	3,415	3,282	96,1	6,27
Mean RS			2,738	3,883	161	12,00
Pato Branco	PR	761	1,217	1,206	99,1	8,42
Campo Mourão	PR	585	2,895	5,563	192,2	11,00
Mean PR			2,056	3,385	146	10,00
Maracaju	MS	384	1,404	2,113	150,5	12,09
Mean MS			1,404	2,113	150,5	12,09
Manduri	SP	710	3,518	5,684	161,6	15,82
Mean SP			3,518	5,684	161,6	15,82
Overall mean			2,464	3,745	152,0	

* State RS = Rio Grande do Sul; PR = Paraná; MS = Mato Grosso do Sul and SP = São Paulo.

with an intermediate cycle. Waxiness in the flag leaf and the spikes is of mean intensity, unlike BR 1, where wax content is low in the flag leaf and high in the spikes. The spike is half-curved. Similar to cultivar BR 1, BRS Serrano is frost-resistant in the growth phase but susceptible to lodging. It is moderately resistant to shattering, a significant advance compared to the susceptibility of BR 1. Regarding diseases, BRS Serrano is resistant to leaf rust, powdery mildew, septoria glume blotch, tan spot, and spot blotch; moderately resistant to scab; and susceptible to stem rust. In preliminary

studies, BRS Serrano appeared to be resistant to barley yellow dwarf virus (BYDV) and soil acidity.

SEED MAINTENANCE AND DISTRIBUTION

BRS Serrano is indexed by the Ministério da Agricultura, Pecuária e Abastecimento (MAPA), under number 20310. Embrapa Wheat is in charge of the genetic seed production of BRS Serrano and Serviço de Negócios para Transferência de Tecnologia da Embrapa (SNT) is responsible for foundation seed.

Table 2. Yield of dry matter of forage and grains (kg ha⁻¹) of the rye cultivar BRS Serrano (with cuts) compared with BR 1, in 2003

Nr. of cuts	Location	Forage		Grains		Forage + Grains	
		BR 1	BRS Serrano	BR 1	BRS Serrano	BR 1	BRS Serrano
1	Passo Fundo	633	725	1,034	728	-	-
	Vacaria	875	648	2,405	2,882	-	-
	Mean	754	686	1,719	1,805	2,473	2,491
	%	100	91	100	105	100	101
2	Passo Fundo	1,537	1,949	2,664	3,386	-	-
	Vacaria	2,989	3,212	462	1,781	-	-
	Mean	2,263	2,580	1,563	2,584	3,826	5,164
	%	100	114	100	165	100	135

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