



BRSMG Majestoso: another common bean cultivar of carioca grain type for the state of Minas Gerais

Ângela de Fátima Barbosa Abreu^{1,3*}, Magno Antonio Patto Ramalho¹, José Eustáquio de Souza Carneiro², Maria José Del Peloso³, Trazilbo José de Paula Júnior⁴, Luís Cláudio de Faria³, Leonardo Cunha Melo³, Everaldo Gonçalves de Barros², Maurílio Alves Moreira², Israel Alexandre Pereira Filho⁵, Maurício Martins⁶, João Bosco dos Santos¹, Carlos Agustín Rava³, Joaquim Geraldo Cáprio da Costa³, and Aloísio Sartorato³

Received 18 July 2007

Accepted 15 September 2007

ABSTRACT - BRSMG Majestoso was developed by UFLA/Embrapa Rice and Beans/UFV/EPAMIG and released for the state of Minas Gerais, Brazil, in view of its high average yield, superior grain quality, anthracnose resistance and low susceptibility to angular leaf spot.

Key words: *Phaseolus vulgaris*, plant breeding, cultivar description.

INTRODUCTION

Common bean yield in Minas Gerais has been increasing and since 2005 the state became the major dry bean producer in Brazil. However, production is still unstable due to a series of factors including the diversity of management systems and biotic stresses. Management systems differ greatly in Minas Gerais. There are from the small-scale subsistence farmers that use little technology to the big farmers that make use of all available technology. Among the biotic stresses, crop diseases play an important role. *Colletotrichum lindemuthianum* and *Phaeoisariopsis griseola*, the causal agents of anthracnose and angular leaf spot, respectively, are two of the most common bean diseases

in Minas Gerais. The most economic way to control them is the use of resistant cultivars. However, as pointed out in the literature, these pathogens appear in numerous pathotypes, which reduces the useful life of common bean cultivars considerably. In this situation the common bean breeding programs must be dynamic, providing farmers with new common bean cultivars with different resistance alleles. Prior to the release of a cultivar it has to be tested in a range of environments. In this sense the institutions Universidade Federal de Lavras, (UFLA), Universidade Federal de Viçosa (UFV), Embrapa Arroz e Feijão (CNPAP) and Empresa de Pesquisa Agropecuária de Minas Gerais (Epamig) have been evaluating new cultivars. As a result of this effort BRSMG Majestoso was released as a new carioca grain

¹ Embrapa Arroz e Feijão, Departamento de Biologia, Universidade Federal de Lavras (UFLA), C.P. 3037, 37.200-000 Lavras, MG, Brasil. *E-mail: afbabreu@ufla.br.

² Departamento de Fitotecnia, Universidade Federal de Viçosa (UFV), 36.570-000 Viçosa, MG, Brasil

³ Embrapa Arroz e Feijão. C.P. 179, 75.375-000, Santo Antônio de Goiás, GO, Brasil

⁴ Empresa de Pesquisa Agropecuária de Minas Gerais (EPAMIG), Centro Tecnológico da Zona da Mata, C.P. 216, 36.570-000, Viçosa, MG, Brasil

⁵ Embrapa Milho e Sorgo, C.P. 285, 35.701-970 Sete Lagoas, MG, Brasil

⁶ Universidade Federal de Uberlândia (UFU), C.P. 593, 38.400-902, Uberlândia, MG, Brasil

type cultivar for common bean cultivation in the state of Minas Gerais.

CULTIVAR ORIGIN AND DEVELOPMENT

BRSMG Majestoso was originated by a cross between Ouro Negro, a black common bean cultivar and Pérola, a carioca grain type cultivar. Crosses were performed in 1998 at the UFLA Biology Department and F₁ seeds obtained. The generations F₂ and F₃ were advanced by the bulk method. From the F₃ population, 398 plants with carioca grain type were selected. These plants were evaluated in the F_{3:4} and F_{3:5} progenies in Lavras and Patos de Minas and 10 of them were selected for evaluation in different trials. Based on the results of these experiments line OP-NS 331 was chosen to participate in the trials for Values for Cultivation and Use (VCU) from 2002 to 2004. Such VCU trials were performed to evaluate 17 lines in 43 environments in the state of Minas Gerais, using cultivars BRSMG Talismã and Pérola as control in a complete randomized block design with three replications.

PERFORMANCE

The 43 environments used for the VCU trials included several locations in the state of Minas Gerais and three growing seasons: fall-winter /2002 (Lavras, Patos de Minas, Viçosa, Coimbra, Leopoldina, Ponte Nova), wet season/2002 (Lavras – two experiments, Unai), dry season/2003 (Lavras, Lambari, Patos de Minas, Sete Lagoas, Florestal, Viçosa, Coimbra, Ponte Nova, Leopoldina), fall-winter /2003 (Lavras, Lambari, Patos de Minas, Uberlândia – two experiments, Capinópolis, Sete Lagoas, Viçosa, Coimbra, Ponte Nova, Leopoldina, Formoso de Minas), wet season/2003 (Lavras, Lambari, Patos de Minas, Uberlândia), dry season/2004 (Lavras, Ijaci, Lambari, Uberlândia, Patos de Minas, Governador Valadares, Viçosa, Coimbra), fall-winter /2004 (Unai). In almost all of them the average yield of cultivar BRSMG Majestoso exceeded the average yield of the controls Pérola and BRSMG Talismã, demonstrating a better adaptation (Table 1). The overall average yield of BRSMG Majestoso was 11.3% higher than the two controls.

OTHER CHARACTERISTICS

Plant type and lodging resistance

Cultivar BRSMG Majestoso has a type III indeterminate growth habit. Its lodging and plant type are very similar to control Pérola, the most grown cultivar in the state of Minas Gerais (Table 2).

Disease reaction

BRSMG Majestoso is resistant to pathotypes 55, 89, 95, and 453 of *Colletotrichum lindemuthianum* and to common bean common mosaic virus and has, under field conditions, an intermediary reaction to *Phaeoisariopsis griseola* (Table 2).

Technological and industrial grain quality

In the common bean quality test, cultivar BRSMG Majestoso presented excellent cooking quality, with a shorter cooking time than both BRSMG Talismã and Pérola (Table 2). Besides, the carioca grain type of BRSMG Majestoso ensures a competitive advantage on the market.

CONCLUSIONS

Due to the high average yield, carioca grain type, excellent cooking quality, anthracnose resistance and low susceptibility to angular leaf spot the cultivar BRSMG Majestoso is yet another possible choice for common bean cultivation in the state of Minas Gerais.

SEED PRODUCTION

Genetic seed stock is maintained by the Universidade Federal de Lavras and basic seed is available at Embrapa Technology Transfer.

PARTNER INSTITUTIONS IN THE CULTIVAR EVALUATION:

- Embrapa Arroz e Feijão - Santo Antônio de Goiás, GO.
- Universidade Federal de Lavras - Lavras, MG.
- Universidade Federal de Viçosa - Viçosa, MG.
- Empresa de Pesquisa Agropecuária de Minas Gerais - CTZM - Viçosa, MG.
- Embrapa Milho e Sorgo - Sete Lagoas, MG.
- Universidade Federal de Uberlândia - Uberlândia, MG.

Table 1. Grain yield (kg ha⁻¹) of cultivar BRSMG Majestoso and the controls Pérola and BRSMG Talismã in three growing seasons and percentage of superiority compared to the control mean

Seasons	Number of environments	BRSMG Majestoso	Pérola	BRSMG Talismã	Relative percentage of control mean
Wet	7	2412	1992	2149	116.5
Dry	17	2329	1878	2101	117.1
Fall-winter	19	2482	2427	2343	104.1
Average yield	43	2413	2138	2199	111.3

Table 2. Biological and physical traits of cultivar BRSMG Majestoso and the controls Pérola and BRSMG Talismã

Trait	BRSMG Majestoso	Pérola	BRSMG Talismã
Plant type ¹	5.2	5.3	5.9
Lodging ²	5.2	5.4	6.0
Days to flowering ³	42.0	45.0	42.0
Days to maturation ⁴	87.0	88.0	84.0
Angular leaf spot ⁵	3.0	3.6	4.2
Cooking time (minutes) ⁶	27.0	31.0	31.0
Soluble solids (%) ⁷	8.9	10.6	11.0
Protein (%) ⁸	23.0	21.3	23.8
100 grain weight (g)	30.6	29.0	26.0

¹ Plant type: 1 - plants of upright growth habit and, 9 - very prostrated plants. Mean of 25 environments.

² Lodging: 1 - less than 5% lodged plants and, 9 - more than 95% lodged plants. Mean of 20 environments. ³ Mean of 10 environments. ⁴ Mean of 12 environments. ⁵ Severity of angular-leaf spot: 1 - asymptomatic plants and, 9 - severe disease symptoms. Mean of 14 environments.

⁶ According to methodology of Proctor and Watts (1987). ⁷ According to methodology of Plhak et al. (1989). ⁸ Determined by micro-Kjeldhal method

REFERENCES

Plhak LC, Caldwell KW and Stanley DW (1989) Comparison of methods used to characterize water imbibition in hard-to-cook beans *Journal of Food Science* 4: 326-336.

Proctor JR and Watts BM (1987) Development of a Modified Mattson Bean Cooker Procedure Based on Sensory Panel Cookability Evaluation. *Canadian Institute of Food Science and Technology* 20: 9-14.