BRSMG União: common bean cultivar with jalo grain for the state of Minas Gerais

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Abstract – The bean cultivar BRSMG União as a new option of a bean cultivar with jalo grains for the state of Minas Gerais. The cultivar BRSMG União had an average grain yield of 9.8% above the mean of the controls (Jalo EEP 558 and BRS Radiante) and was resistant to powdery-mildew.

Key words: Plant breeding, Phaseolus vulgaris

INTRODUCTION

For common bean cultivars with so-called jalo (large and yellow) grains, grown and sold in certain regions of the state of Minas Gerais, market prices are generally the best. However, most cultivars with this grain type have some problems in terms of pathogen susceptibility, particularly to Erysiphe poligoni, the causal agent of powdery mildew (Paula Júnior and Zambolin 2006). Although this disease is not one of the most important of common bean in Brazil, it can cause significant yield losses, depending on the variety, as in the case of ‘Jalo EEP 558’.

Since few cultivars with jalo grain are available for planting, the institutions that work with common bean breeding in Minas Gerais (Federal University of Lavras - UFLA and of Viçosa -UFV), Agricultural Research Corporation of Minas Gerais (Embrapa) and Brazilian Agricultural Research Corporation (Embrapa), joined efforts in the evaluation of lines with this type of grain with a view to obtain and recommend options of new cultivars that are superior to ‘Jalo EEP 558’, which had been indicated for Minas Gerais in 1980 (Ramalho and Abreu 2006). As a result of this cooperation, ‘BRSMG União’ can now be recommended as a new option of a common bean cultivar with jalo grains for Minas Gerais.

BREEDING METHODS

The cultivar BRSMG União was originated by the cross between the cultivars Jalo EEP 558 and ESAL 686. After hybridization and to obtain the F₁ generation, ‘Jalo EEP 558’ was backcrossed. The F₁BC₁ seeds were sown in an experimental area of the Department of Biology of UFLA and 64 F₁:2 BC₁ progenies were selected. The seeds of these
progenies were planted again for the F$_{1}$:BC$_{1}$ generation, which was evaluated in experiments with replications and 33 progenies were selected specifically for resistance to powdery mildew (E. poligoni) and for jalo grain traits.

The 33 F$_{1}$:BC$_{1}$ progenies were evaluated in the same experimental area, together with the parents Jalo EEP 558 and ESAL 686 and cultivar Pérola as control. The severity of powdery mildew was assessed on a 1-9 rating scale, from 1 (0% of infection) to 9 (80-100% of infected leaf area) and yield in kg ha$^{-1}$. The yield of eighty-four percent of the progenies was better than of cultivar Jalo EEP 558, and among these, one line also stood out with the characteristic grain type of the trade group jalo, aside from the good resistance to powdery mildew.

From the dry season of 2005 until rainy season 2006/2007, this line was evaluated in tests to determine the Value for Cultivation and Use (VCU), together with over 21 other lines and the controls ‘BRS Radiante’ and ‘Jalo EEP 558’. The experiments were conducted by the partnership institutions in environments in the state of Minas Gerais (Table 1), using a randomized complete block design with three replications and plots consisting of four 4-m rows.

### CULTIVAR CHARACTERISTICS

#### Plant height and lodging resistance

Cultivar BRSMG União has an indeterminate, type III growth habit. In the evaluations of plant architecture and lodging tolerance on a rating scale, its performance was similar to the control ‘Jalo EEP 558’ (Table 2).

#### Disease response

In the field evaluations, ‘BRSMG União’ was tolerant and/or resistant to natural infestation by some pathogens (Fusarium wilt, powdery mildew, rust, and angular leaf spot), with a particularly good resistance to powdery mildew.

Table 1. Mean grain yield (kg ha$^{-1}$) of the cultivar BRSMG União and controls (‘BRS Radiante’ and ‘Jalo EEP 558’) per location, season and year of assessment in the state of Minas Gerais

| Location     | Growing season | Year | BRSMG União | Controls | % of the Control mean |
|--------------|----------------|------|-------------|----------|-----------------------|
|              |                |      |             | Radiante | Jalo                  |
|              |                |      | 2058        | 2242     | 119.8                 |
|              |                |      | 2048        | 2102     | 107.8                 |
|              |                |      | 105.5       | 136.5    | 110.9                 |
|              |                |      | 105.5       | 136.5    | 110.9                 |
|              |                |      | 112.5       | 106.5    | 110.6                 |
|              |                |      | 123.4       | 117.3    | 111.9                 |
|              |                |      | 102.2       | 100.2    | 109.8                 |
|              |                |      | 126.5       | 134.9    | 115.8                 |
|              |                |      | 121.7       | 114.7    | 113.7                 |
|              |                |      | 112.5       | 101.5    | 110.9                 |
|              |                |      | 95.7        | 104.2    | 110.9                 |
|              |                |      | 112.6       | 104.2    | 110.9                 |
|              |                |      | 127.2       | 114.9    | 110.9                 |
|              |                |      | 62.8        | 104.2    | 110.9                 |
|              |                |      | 127.2       | 114.9    | 110.9                 |
|              |                |      | 89.1        | 89.2     | 110.9                 |
|              |                |      | 126.4       | 110.7    | 110.9                 |
|              |                |      | 2043        | 1796     | 110.8                 |
|              |                |      | 2369        | 2165     | 110.9                 |
|              |                |      | 2253        | 2149     | 107.8                 |
|              |                |      | 2241        | 2060     | 109.8                 |

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disease to which the control ‘Jalo EEP 558’ is highly susceptible (Table 2). Under artificial inoculation, ‘BRSMG União’ was susceptible to curtobacterium wilt, moderately resistant to common bacterial blight and resistant to the pathotype 475 of the fungus Colletotrichum lindemuthianum, causal agent of anthracnose.

Crop cycle

The flowering of ‘BRSMG União’ occurs when the plants are on average 35 days old and the crop cycle is completed within around 77 days, thus representing a semi-early cultivar.

Yield

The average grain yield of ‘BRSMG União’ was higher than of the controls in most evaluation environments (Table 1). It also performed better than the controls when considering the mean of the locations in the state in each growing season and the mean of all sites and seasons (9.8%).

Industrial and technical grain quality

Cultivar BRSMG União has evenly cream-colored grains, similar to ‘Jalo EEP 558’, with an average 100-seed weight of 39.6g. The culinary quality is excellent (23.8% protein) and the cooking time 29 minutes, comparable to most bean cultivars recommended nowadays.

BASIC SEED PRODUCTION

Cultivar BRSMG União was registered by Embrapa, EPAMIG, UFLA, and UFV in the National Register of Cultivars (RNC) of the Brazilian Ministry of Agriculture, Livestock and Supply (MAPA) on Feb 8, 2011, under number 27606, and the request for protection is being analyzed by the National Plant Varieties Protection Service (SNPC). EPAMIG is in charge of the seed production.

PARTNER INSTITUTIONS IN THE EVALUATION OF THE CULTIVAR

Embrapa Arroz e Feijão, Universidade Federal de Lavras, Universidade Federal de Viçosa, Empresa de Pesquisa Agropecuária de Minas Gerais, Embrapa Milho e Sorgo, Universidade Federal de Uberlândia and Cooperatinga

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