Crop Breeding and Applied Biotechnology 6:175-178, 2006
Brazilian Society of Plant Breeding. Printed in Brazil

'BRS Guariba': white-grain cowpea cultivar for the mid-north region of Brazil

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Received 31 January 2006

Accepted 05 April 2006

ABSTRACT - *BRS Guariba is a cultivar that belongs to the white commercial class, with a early-maturing cycle and resistance to powdery mildew (*Erysiphe polygoni*), brown blotch (*Coletrichum truncatum*) and Cowpea aphid borne mosaic virus-CABMV. It attained mean grain yields of 1475 and 1508 kg ha^{-1} in the states of Piauí and Maranhão, respectively. It is indicated for cultivation in the Mid-North region of Brazil*

Key words: ***Vigna unguiculata***, breeding, yield, tegument, seed.

INTRODUCTION

Cowpea, macassar bean or rope bean (*Vigna unguiculata* (L.) Walp.) is one of the most important crops of the Brazilian North and Northeast regions, as food source as much as in the generation of employment and income (Freire Filho et al. 2003).

In the past, cowpea was grown by farmers that planted it on a small scale, manually. However, in the last years, it has attracted the interest of producers that practice high-technology agriculture. In this context, cowpea is nowadays grown in savannas, both in rainfed systems and in irrigated cultivation, under conventional aspersion or center pivot, using mechanized harvesting systems. The demand for more adapted cultivars to the improved production systems, with some differentiated characteristics compared to the traditional cultivars has been growing.

The high-technology agriculture asks for erect cultivars with compact plant architecture, lodging resistance and pod maturity within a concentrated period. Besides, cultivars should have grains of wide acceptance to facilitate the trade with different consumption centers. Such characteristics also interest traditional producers, who are, by and by, modernizing their cultivation systems.

There are several commercial classes of cowpea cultivars. The white class is the one with highest commercial value and consumer preference. The white tegument cultivars, presently available, have shown high virus susceptibility. This poses a serious problem, since this commercial class has great acceptance and is preferred for cultivation in some areas of Acre, Pará, Maranhão, Piauí, Ceará and Rio Grande do Norte states (Rocha et al. 2003). Some cultivars belonging to this commercial class were released (Monteiro in 1998, BRS-Mazagão in 2000 and BRS Paraguaçu in 2002).

CULTIVAR ORIGIN AND DEVELOPMENT

BRS Guariba was derived from the cross IT85F-2687 x TE87-98-8G as part of the Cowpea Breeding

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Program of the Embrapa Meio-Norte, in Teresina, Piauí state, Brazil. The segregating generations from F_2 to F_6 were advanced by the single pod descent method. The F_5 population was planted and the plants were selected individually based on earliness, plant vigor, grain physical quality, and virus reaction. From the F_6 families, line TE96-282-22G was selected for its grain yield and chemical quality, architecture, and virus reaction. It was submitted to a preliminary evaluation, in a preliminary trial and in the regional trial over four agricultural years, from 2000 to 2003. In the regional trial, this line was evaluated in ten trials each in the states of Piauí and Maranhão in the experimental design of completely randomized blocks, with four replications.

PHENOLOGIC AND AGRONOMIC CHARACTERISTICS

Some phenologic and agronomic characteristics of BRS Guariba are presented in Table 1. The cultivar has an indeterminate growth habit, semi-erect plant and maturity cycle of 65 to 70 days. Despite the indeterminate growth habit the branches are relatively short and the lodging resistance is good. Pods are located above the foliage and purple-colored when mature. Grains are white and belong to the white commercial class and white subclass. The 100-grain weight is 19.5 g, which exceeds the controls Vita 7 (Freire Filho et al. 1983) and Mazagão (BRS-Mazagão 2000). Its plant architecture is appropriate for mechanized harvesting, since a preharvest desiccant is applied to defoliate the cowpea plants.

PERFORMANCE

The BRS Guariba grain yields in the state of Piauí, from 2000 to 2003, in 12 trials, are presented in Table 2. In the years 2000/2001, BRS Guariba outmatched the control Mazagão, but in the years 2002/2003, when the control was Vita 7, it was surpassed by the control in

Table 1. Phenologic and agronomic characteristics of BRS Guariba

Character	Characteristic
Growth habit	Indeterminate
Plant architecture	Semi-erect
Leaf type	Globose
Flower color	White
Calyx color	Purple
Keel color	White
Wing color	White
Standard color	White
Immature pod color	Green
Pod color in the physiologic maturity	Purple
Pod color in the harvest maturity	Purple
Pod length	17.80 cm
Grains/pod	12
Level of pod insertion	Above the foliage
Grain form	Ovoid
Grain color	White
Tegument color	White
100 grain weight	19.50 g
Grain index (grain weight/pod weight)	78.00 %
Grain protein content	22.1 %
Commercial Class	White
Commercial Subclass	White
Days to flowering	41
Maturing cycle	65 – 70 days

Table 2. Grain yield of BRS Guariba and the control in four trials in the state of Piauí, from 2000 to 2003

Cultivar	Year				Grain Yield (kg ha^{-1})	
	2000	2001	2002	2003	Pondered mean	Relative yield %
BRS Guariba	1,061	1,869	1,486	1,908	1,475.0	115.20
Contro	1,762[1]	1,534[1]	1,513[2]	1,960[2]	1,279.7	100.00
Number of trials	5	3	2	2	12	-

[1] BRS-Mazagão - Cultivar indicated for Amapá and Piauí states
[2] Vita 7 - Cultivar indicated for Piauí state

Table 3. Grain yield of BRS Guariba and the control in four trials in the state of Maranhão, from 2000 to 2003

Cultivar	Agricultural year				Grain yield (kg ha^{-1})	
	2000	2001	2002	2003	Pondered mean	Relative yield %
BRS Guariba	1,505	1,529	1,296	2,098	1,508.1	112.80
Control	1,251[1]	1,431[1]	1,179[2]	1,862[2]	1,336.0	100.00
Number of trials	4	3	3	1	11	-

[1] BRS - Mazagão - Cultivar indicated for Amapá and Piauí states
[2] Vita 7 - Cultivar indicated for Piauí state

spite of attaining a high yield. However, considering the pondered mean of the four years, BRS Guariba outperformed the control mean by 15.20%, with a yield of 1,475 kg ha^{-1}. In the state of Maranhão (Table 2) in the same period, in 11 trials, BRS Guariba outdid the control in the annual means and in the mean of the period by 12.8% with a mean yield of 1,508 kg ha^{-1}. Adaptability and stability of BRS Guariba were the best among the tested genotypes, besides the good yield performance (Freire Filho et al. 2003), in studies carried in Piauí and Maranhão from 2000 to 2001.

OTHER CHARACTERISTICS

Resistance to biotic and abiotic stress

In field evaluations BRS Guariba showed better tolerance to white fly (*Bemisia* spp.) than the controls. The cultivar presented resistance to powdery mildew (*Erysiphe polygoni* DC.) and to brown blotch (*Coletotrichum truncatum (*Schw.) Andrus & Moore). It is resistant to *Cowpea aphid-borne mosaic virus*-CABMV (Figueiredo et al. 2000) and during the entire selection process it did not present symptoms of *Cowpea golden mosaic virus*-CGMV in any of the resistance evaluations realized in field conditions. However, it was susceptible to *Cowpea severe mosaic virus*-CPSMV and to *Rhizoctonia solani* Kühn fungi. BRS Guariba is moderately drought and heat tolerant.

Technological and industrial grain quality

The chemical analysis of dry BRS Guariba grains presented the following results: 10.18% moisture; 22.09% protein; 63.11% carbohydrate; 1.06% fat; and 3.56% ash. The imbibition time until the dry grains doubled weight was 58 minutes. In the traditional preparation process it was considered fast cooking and in the palatability test it was characterized as excellent.

CONCLUSION

Considering the yield and quality results, BRS Guariba fulfills the conditions for release for commercial cultivation in the Mid-North region of Brazil, which includes the states of Piauí and Maranhão.

SEED PRODUCTION

Genetic seed stocks are maintained by Embrapa Meio-Norte and foundation seed is available at Embrapa Transferência de Tecnologia.

PARTNER INSTITUTIONS IN THE CULTIVAR ASSESSMENT

Embrapa Meio-Norte; Empresa estadual de Pesquisa Agropecuária da Paraíba – EMEPA; and Empresa Baiana de Desenvolvimento Agrícola S. A. - EBDA.

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