EVALUATION OF EXPORT COMMON BEAN GENOTYPES IN BRAZIL

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Paraná, Minas Gerais, Goiás and the Federal District of Brasilia are the Brazilian leading common bean producer states, representing 55% of the total produced in the country, with a total out put of 1,563.380 ton on an area of 1,072.001 ha (FEIJÃO, 2010). The most consumed bean type is "carioca" (70%). Other types are: black, purple, pink, red, brown, jalo (kidney), mottled, and white (Del Peloso & Melo, 2005). Although Brazil is the largest beans producer, the amount exported is minimal due to high internal consumption, low acceptance and low market value abroad. An alternative to insert beans produced in Brazil in the international market would be to offer beans type Alubia (large white), Cranberry, Dark Red Kidney, Light Red Kidney, Pinto, and Navy (small White). However, the main obstacle for implementing that strategy is the availability of cultivars with that type of grain at farm level. To supply demand the Embrapa Rice and Beans research program is working on the identification of genotypes gathering desirable characteristics to indicate as new cultivars.

In 2007, 2008 and 2009 eighteen trials were carried out in the states of Parana (nine at the dry and wet seasons); six in Goiás/Federal District and four in Minas Gerais (at the winter cropping season). The experimental design used was a completely randomized block design with three replicates arranged in four plots with four meter rows and data collected on the two central rows. In each trial 15 genotypes of common beans were tested and from those 11 were promising lines (Cranberry, Light Red Kidney, Dark Red Kidney and Calima) and four controls: Jalo early harvest, BRS Radiante, Etna and Hooter (Table 1). Evaluations were carried out for the following characteristics: plant architecture, lodging and disease resistance (anthracnose, common bacterial blight, angular leaf spot, mildew and rust) using a 1 (totally favorable) to 9 (totally unfavorable) raking scale. 100 seed mass was also determined. Yield data were submitted to the analysis of variance followed by joint analysis. For mean comparison the Scott Knot test at 10% was used.

The joint analysis showed good experimental precision (CV=17%) and significant differences ($P<0,01$) were detected among genotypes, environment as well as genotype x environment interaction. Regarding genotype performance, control BRS Radiante yielded the most (Table 1). This genotype has striped seeds released for planting in those states. Genotypes Red Kanner, CAL-96, and BRS Embaixador yielded the same as BRS Radiante, being also resistant to anthracnose and rust, with 100 seed weight above 46 grams. BRS Embaixador presented the best grades for plant architecture and lodging. The two genotypes in the second average group along with controls Hooter and Etna were highly susceptible to anthracnose, with grades 7 (Poroto LRK-ARG) and 9 (Importado Notamil). In the third average group, four genotypes were grouped along with Jalo Precoce. Among those, Poroto DRK-ARG showed high susceptibility to anthracnose, Chennok and Light Red Kidney-ARG showed high susceptibility to common bacterial blight. Genotypes Montcalm and Poroto Bayo made up the fourth average group and were the least productive than all controls. Besides that, Poroto Bayo-ARG was the genotype with the worst performance for plant architecture, lodging, and disease resistance, besides yielding very small beans. Therefore, genotypes

Red Kidney, CAL 96, BRS Embaixador, Light Red Kidney-ARG, Chenook, and Montcalm were selected as promising, and will be evaluated to identify new bean cultivars for export.

Table 1. Average yield (PROD) (kg ha^{-1}), average(1) and maximun(2) grades for plant architecture (ARQ), lodging (ACA), reaction to common bacterial blight(CBC), angular leaf spot (MA), mildew (OI), rust (FE), anthracnose (AN) and 100 seed weight (M100) of 12 export type common bean genotypes, evaluated in 18 environments in the states of Goiás/Distrito Federal, Minas Gerais and Paraná (Brazil), in 2007, 2008 e 2009.

GENÓTIPO	PROD	ARQ	ACA	CBC	MA	OI	FE	AN	M100
RED KANNER	2027 a	4(1)/6(2)	4/7	4/7	3/5	4/7	1/1	1/1	46
CAL - 96	1988 a	4/6	3/4	2/3	2/3	5/8	1/1	1/1	54
BRS RADIANTE	1972 a	4/6	3/5	5/7	2/4	1/2	2/3	1/1	41
BRS EMBAIXADOR	1937 a	3/5	3/4	4/8	2/3	6/8	1/1	1/1	53
POROTO LRK-ARG	1850 b	4/5	3/4	4/8	1/2	3/7	2/3	3/7	51
HOOTER	1848 b	3/7	3/4	5/7	2/5	4/7	2/4	1/1	53
IMPORTADO NOTAMIL	1846 b	4/7	3/5	6/8	1/2	5/8	2/3	6/9	52
ETNA	1785 b	4/7	3/6	5/7	1/1	6/8	2/4	4/9	49
LIGHT RED KIDNEY-ARG	1742 c	6/8	5/8	5/9	3/5	3/5	1/2	1/1	53
JALO PRECOCE	1740 c	5/6	3/4	3/6	2/2	3/6	1/1	1/1	40
CHINOOK	1707 c	4/6	3/4	6/9	1/1	5/8	2/6	1/1	48
DIACOL CALIMA	1681 c	4/5	3/4	3/6	2/3	5/7	1/2	1/1	49
POROTO DRK-ARG	1632 c	6/7	5/8	5/8	2/2	5/8	3/6	4/9	39
MONTCALM	1540 d	4/6	4/7	5/7	2/3	6/8	1/2	1/1	50
POROTO BAYO-ARG	1443 d	7/9	6/9	5/8	5/9	5/8	6/8	9/9	39

[1]Means followed by the same letter do not differ among themselves (Scott Knott at 10% probability.

REFERENCES

DEL PELOSO, M.J.; MELO, L.C. Potencial de rendimento da cultura do feijoeiro comum. Santo Antônio de Goiás: Embrapa Arroz e Feijão, 2005. 131p.

FEIJÃO: dados conjunturais do feijão (área, produção e rendimento) - Brasil - 1985 a 2008. Disponível em: http://www.cnpaf.embrapa.br/apps/socioeconomia/index.htm. Acesso em: 07 jan. 2010.