GENOTYPES OF COMMON BEANS WITH GRAIN TYPE CARIOCA IN THE CENTRAL REGION OF BRAZIL

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INTRODUCTION

In the last years, Brazil has ranked first in production and consumption of common beans, *Phaseolus vulgaris* L., which is a basic food and one of the main sources of proteins in the diet of Brazilian population. Among of the different common beans types of grain, the carioca occupies 70% of the market (Del Peloso & Melo, 2005). The breeding programs have supplied the demand of Brazilian market with new cultivars with desirable characteristics, such as yield stability and also contributed to increase yield. The common bean breeding program of Embrapa Rice and Beans Research Center systemize the evaluations of lines developed in the program in a national network which includes a central region of the country (Goiás, Distrito Federal, Mato Grosso and Mato Grosso do Sul), responsible for 13,5% of the national bean production (IBGE, 2008) (383.856 t), in 206.235 ha. The final evaluation of the lines is done in a network of evaluation trials, in several environments, which should represent the diverse environmental conditions that bean cultivars can be grown.
The indication of new cultivars has contributed for increase of yield in this region, from 1.324 kg ha^{-1} in 1997, to 1.861 kg ha^{-1} in 2007 (IBGE, 2008). So, the program looks for new lines with better phenotypes that can be indicated as new cultivars.

MATERIALS AND METHODS

In 2005 and 2006, a network of trials were conducted during rainy, dry and winter growing seasons, in 29 environments in the Central Region of Brazil in the States of Goiás, Distrito Federal, Mato Grosso and Mato Grosso do Sul. The experimental design was randomized complete blocks, with three replications and plots of four rows measuring four meters. The yield data were collected in the two center rows. Each trial was constituted of 14 genotypes of common beans carioca grain type (Table 1). Evaluations of plant architecture, resistance to disease and lodging tolerance, were made using a grate scale. Yield data were submitted to analyze of variance and joint analyze grouping all trials. The Duncan test (0.05) was used to compare treatment means.

RESULTS AND DISCUSSION

The joint analyze showed a good experimental precision (CV=15.3 %) and it were detected significant difference ($P<0.01$) among genotypes, environments and interaction genotypes x environments. It was identified some lines that can be indicated as new cultivars. The lines CNFC 10429 e CNFC 10432 were most productive with mean yield equal to obtained by BRS Pontal, used as control (Table 1). Those lines presented plant architecture upright, with high insertion of pod, closed ramifications and few vines, and low grade of lodging, when compared to BRS Pontal, which presents plants ramified, lodged, with many vines. Besides, these lines were better than cultivar Pérola in yield, plant architecture and lodging. The cultivar Perola is the most grown in the country.

The line CNFC 10408 presented yield inferior to obtained by BRS Pontal (control) and superior to that obtained by Pérola (control). This genotype also presented better plant architecture and higher tolerance to lodging than the two control cultivars. Besides, it showed reaction to common bacterial blight similar to showed by BRS Pontal, which is a bean cultivar with grain type carioca with higher level or resistance to that disease. Other advantage of the line CNFC 10408 the median-short cycle (75 to 85 days), when compared to BRS Pontal and Pérola which has a normal cycle (85 a 95 days). The line CNFC 10467, which has a retardation of darkening in the seed coat had the worst performance in yield, compared to the control cultivars.

The superior lines will be indicated for growing, initially for the State of Goiás during the rainy and winter growing seasons. For the other States, new trials will be conducted to complete the minimum number of trials required to register the cultivars. Those trials started to be conducted in 2008 and are being conducted in these States and in the seasons in which the minimum number of trials has not been satisfactory.

Table 1. Yield (kg ha^{-1}), average grades[(1)] and e highest grades[(2)] for evaluations of plant architecture (ARQ), lodging (ACA), and reaction to common bacterial blight (CBC), angular leaf spot (MA) and mildew (OI) and rust (FE), of 14 genotypes of common beans with grain type Carioca, evaluated in 29 environments in Central Region of Brazil, in 2005 and 2006.

GENOTYPE	YIELD	ARQ	ACA	CBC	MA	OI	FE
CNFC 10429	2,404 a	4[(1)]/5[(2)]	4/6	4/7	3/8	1/2	2/3
BRS Pontal	2,350 ab	6/8	6/8	3/4	5/8	4/6	1/1
CNFC 10432	2,304 abc	4/6	4/6	4/8	4/7	2/4	1/1
CNFC 10431	2,257 bc	4/6	3/6	4/8	4/7	3/7	1/2
CNFC 10410	2,221 cd	4/7	4/6	4/8	5/8	1/2	1/1
CNFC 10408	2,214 cd	4/6	4/6	3/5	7/9	5/7	2/4
CNFC 10470	2,131 de	5/7	5/7	5/7	6/9	2/3	1/1
CNFC 10438	2,120 def	5/6	4/7	3/6	4/8	3/6	2/3
Pérola	2,092 efg	6/8	6/9	4/7	6/8	3/4	3/5
CNFC 10455	2,064 efg	4/5	4/6	5/9	5/7	3/6	5/7
Iapar 81	2,018 fg	5/7	5/8	4/6	7/8	3/7	3/6
FTS Magnífico	2,004 g	5/8	5/7	3/5	6/9	5/7	2/4
CNFC 10444	1,898 h	4/7	3/6	4/7	4/7	2/3	2/3
CNFC 10467	1,896 h	6/7	5/7	4/7	5/9	2/4	2/3

[1]Means followed by the same letter do not differ by Duncan test 0.05 of probability.

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