

# EVALUATION OF THE CARIOCA AND BLACK BEANS GROUP LINES INOCULATED WITH *RHIZOBIUM TROPICI* STRAINS

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## INTRODUCTION

Studies with bean plant in soils with low N availability indicate the need to obtain segregating families seeking to get efficient cultivars to the biological nitrogen fixation (BNF). Due to the great genetic variability among beans cultivars, the identification of more efficient genotypes to BNF will make possible the selection of more efficient symbiotic systems, reducing or eliminating the Nitrogen fertilization (Hardarson et al, 1996; Bliss, 1993). The objective of the work was to evaluate the crop production of advanced lines of Carioca and Black bean groups, inoculated with two *Rhizobium tropici*.

## MATERIAL AND METHODS

Two trials were carried out in Ponta Porã district, MS, Brazil (22°32' S e 55°42' W), in a low fertility clay oxisol area. The experimental design was a randomized block with three replications. The tested treatments resulted of a 14x2 factorial for the Carioca bean group and a 12x2 factorial for the Black bean group, being 14 and 12 the beans genotypes and 2 the levels of nitrogen covering fertilization (0 and 60 kg ha<sup>-1</sup> of N-urea), applied 30 days after the sowing. In the treatment without N fertilization the seeds were inoculated with a *Rhizobium tropici* bacteria mixture (SEMIA 4077 (CIAT 899) and SEMIA 4080 (PRF 81)) with density of 10<sup>9</sup> cells g<sup>-1</sup> of turf in the proportion of 1000 g of inoculate for 50 kg of seeds. Before sowing the experimental area was fertilized with 320 kg ha<sup>-1</sup> of the formulated 00-20-20 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O). The obtained datas were submitted to variance analyses and the averages compared by Tukey test at 5%.

## RESULTS

Significant differences (p<0.05) of crop production were observed among the lines tested for the two bean groups, indicating significant genetic variability among the genotypes. This is a satisfactory result, because indicates the possibility of selection of more productive lines for the Carioca and Black bean group. However, significant effect for N fertilization on crop production was observed only for lines of Black bean group. In this case the observed effect occurred due to covering N fertilization. When the seeds inoculation with *Rhizobium tropici* bacteria strains was used, seeking the nitrogen biological fixation, significant effects were not observed among the lines, independently of the bean group considered (Table 1). In agreement with GRAHAN (1981) factors as carbohydrates supply for the nodules and N absorption should be contributed to the genotypic variability of the lines that presented rates of BNF that supplied the N plant demand and guaranteed similar crop production with those obtained in the treatments with N covering fertilization. In the black bean group stood out the lines CNFP-10104, CNFP-10109 and BRS-Grafite, that presented medium grains production of 1732, 1754 and 1773Kg ha<sup>-1</sup>, respectively. Among the lines of Carioca group the prominence were to the lines CNFC-10438 and BRS-Pontal, that presented grains production of 1550 and 1741 kg ha<sup>-1</sup>, respectively. These values for grains production are higher

than national average that is of 800 kg ha<sup>-1</sup> and they indicate high capacity of BNF and great productive potential of these lines.

**Table 1.** Medium crop production values of Carioca and Black bean groups in function of the inoculation and N fertilization.

Bean Carioca Group *		Bean Black Group	
Inoculated	N fertilization	Inoculated	N fertilization
----- Crop production (kg ha <sup>-1</sup> ) -----			
1255 a	1.360 a	1545 b	1658 a

\* Averages followed by the same letter for each Bean group, do not differ by Tukey test at 5%.

## CONCLUSIONS

- The lines of Carioca bean group presented high capacity of biological nitrogen fixation and high grains production but did not differ from those obtained in the treatments with N fertilization. Outstanding lines CNFC-10438 and BRS-Pontal, generated grain production of 1550 and 1741 kg ha<sup>-1</sup>, respectively.
- The highest grains crop productions, among bean Black group lines, were obtained when the N fertilization was used. However the CNFP-10104, CNFP-10109 and BRS-Grafite lines when only inoculated presented medium grains production of 1732, 1754 and 1773 kg ha<sup>-1</sup>, respectively.
- The high crop productions obtained by some inoculated lines of Carioca and Black bean groups, indicate the possibility of selection of the high performance cultivate and independent of the N fertilization.

## REFERENCES

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# ANSWER OF TWO CARIOCA BEANS CULTIVAR TO THE CHEMICAL AND ORGANIC FERTILIZATION

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## INTRODUCTION

The bean plant (*Phaseolus vulgaris* L.) is cultivated in different regions of the Brazil. It is an important protein source, especially for smaller budge populations. The brazilian dry bean production in 2006 was about 3.5 million tons and Paraná state participated with 23.7% of this production (IBGE, 2007). In Brazil the utilization of urban residues *in natura* or composed in soil organic fertilization is a frequent agricultural practice. This work was carried out with the objective to evaluate the effect of the *in natura* urban residues (the grinding of tree branches) and chemical fertilization, on the components of production and the grain yield of two carioca beans cultivar.

## MATERIAL AND METHODS

The experiment was carried out at the experimental farm of the State University of Londrina, Londrina, Paraná, Brazil. The experimental design was a randomized block with treatments distributed in a 5x2 factorial arrangement, which the factors were five doses (0, 15, 30, 45 and 60 Mg ha<sup>-1</sup>) of urban organic residues (the grinding of tree branches) and two chemical fertilization levels (without and with inorganic fertilization (80, 50 and 30 kg ha<sup>-1</sup> of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, respectively)), with three replications. Two bean cultivar of the Carioca (Colibri and Eldorado) were tested. The evaluated variables were: pods number/plant (**PNP**), grain mass/plant (**GMP**), the 1000 grains mass (**M1000**) and grain yield. The obtained data was submitted to variance analyses and the averages were compared by Tukey test at 5% or adjusted to regression equations.

## RESULTS AND DISCUSSION

The **PNP** and **GMP** medium values of the two carioca beans cultivars in the chemical fertilization treatments were significantly higher than those observed in the treatments without fertilization. Only for Eldorado cultivar, the **M1000** was influenced by chemical fertilization (Table 1). However, the observed values (230.0 g) were lower than regional average (IAPAR, 2007).

**Table 1.** Pods number/plant (**PNP**), grain mass/plant (**GMP**) and 1000 grain mass (**M1000**) for Colibri and Eldorado bean cultivars in response to chemical fertilization.

Variables	Colibri		Eldorado	
	With fert.	Without fert.	With fert.	Without fert.
<b>PNP</b>	9.8 a	6.5 b	9.3 a	5.5 b
<b>GMP (g)</b>	9.6 a	6.1 b	6.6 a	3.4 b
<b>M1000 (g)</b>	n.s	n.s	186.0 a	167.0 b

Averages followed by the same letter in the lines for each cultivar, do not differ by Tukey test at 5%.

The grain yield of the Eldorado cultivar was significantly influenced by chemical and organic residue fertilizations. In the absence of chemical fertilization, the grain yield reduced with the