

## NITROGEN FERTILIZATION AND INOCULATION WITH *RHIZOBIUM TROPICI* IN BLACK BEAN

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### INTRODUCTION

Although being very important to the Brazilian society, the bean crop average yield is still far below its potential. Several factors in the production system of this legume have been contributing to this scenery. We can affirm that some factors, such as, the lack adapted genotypes to the different producing areas and the inadequate handling of nitrogen fertilization contributed for this situation. This work had as objective to evaluate the behavior of lineages of black bean plant submitted to nitrogen fertilization and inoculation with *Rhizobium tropici*.

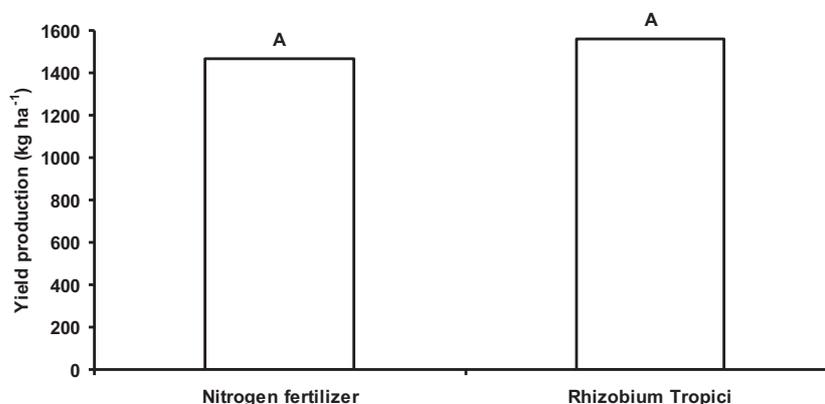
### MATERIAL AND METHODS

The experiment was carried out on the agricultural year of 2009 in Dourados, Mato Grosso do Sul state, Brazil (22°16'S; 54°49'W). The lineages of beans from the black group tested were: CNFP 11973, CNFP 11976, CNFP 11978, CNFP 11979, CNFP 11983, CNFP 11984, CNFP 11985, CNFP 11991, CNFP 11994 and CNFC 11995. The control treatments were the cultivars BRS Campeiro, BRS Esplendor, BRS Supremo and IPR Uirapuru. The experimental design was in randomized block with three replications in a 14x2 factorial arrangement, 14 cultivars (10 new lineages and 4 commercial cultivars) and 2 ways to supply nitrogen (N fertilization and biological fixation - BNF). For the treatments with nitrogen fertilization, 40kg/ha of N were applied on the sowing and also in coverage after 30 days after the germination. Urea was used as a source of N. For the treatment with BNF, the seeds were inoculated with *R. tropici* strains CIAT 899 and PRF 81, as described by Pelegrin et al (2009). The productivity data were transformed (square root of x +1) and subjected to analysis of variance. The means were compared by Tukey test at 5%.

### RESULTS AND DISCUSSION

It was not observed significant difference to the average productivity (new lineages and commercial cultivars) between treatments with nitrogen fertilization and with *Rhizobium tropici* inoculation (figure 1). This result is similar to Silva et al. (2009) that did not find differences in dry matter production of aerial part of bean plants when compared with the same treatments. However, in the treatment with nitrogen fertilization there was no difference on the yield of the new lineages and also between the new lineages and the control (Table 1). This fact indicates that the lineages tested have a productive potential similar to the commercial cultivars. On the other hand, when the seeds were inoculated with *R. tropici*, the control and the lineages CNFP 11973, CNFP 11976 and CNFP 11995 presented a yield higher than the lineage CNFP 11979 (Table 1). In this case, it should be noted that the lines CNFP 11973, CNFP 11976 and CNFP 11995 showed highest yield to that obtained with commercial varieties represented by the control. This indicates for these beans lineages, the possibility to use the seed inoculated with *R. tropici* replacing the mineral nitrogen fertilization,

especially for the lineage CNFP 11973 that showed higher yield when inoculated. To confirm these results it is necessary to run new experiments.



**Figure 1.** Average yield of bean grains from black bean group when supplied with mineral nitrogen fertilization and biological fixation with *Rhizobium tropici* (CIAT 899 e PRF 81). Equal letters on the bar indicates that the averages do not differ by Tukey test at 5% probability.

**Table 1.** Average yield of different bean lines of the black bean group fertilized with mineral nitrogen or inoculated with R tropici (CIAT 899 and PRF 81).

Lineage	Yield (kg.ha <sup>-1</sup> )	
	Fertilization (Mineral N)	Inoculation ( <i>R. tropici</i> )
Control*	1,735 Aa	2,042 Aa
CNFP 11973	1,174 Ba	2,291 A a
CNFP 11976	1,881 Aa	2,161 Aa
CNFP 11978	1,015 Aa	1,001 Aab
CNFP 11979	719 Aa	615 Ab
CNFP 11983	1,865 Aa	1,677 Aab
CNFP 11984	1,395 Aa	1,371 Aab
CNFP 11985	1,983 Aa	1,294 Aab
CNFP 11991	1,689 Aa	1,650 Aab
CNFP 11994	889 Aa	844 Aab
CNFP 11995	1,784 Aa	2,240 Aa

Averages followed by capital letter in the row and lower in the column do not differ by Tukey test at 5%,  
\* represented by four commercial cultivars (Campeiro, BRS Esplendor, BRS Supremo e IPR Uirapuru)

## CONCLUSIONS

The bean lineage CNFP 11973 showed highest yield when the seeds were inoculated with *Rhizobium tropici*,

On the average yield of the black beans group there was no difference between mineral N fertilization and inoculation with *Rhizobium tropici*,

## REFERENCE

SILVA, E,F,da; MERCHETTI, M,E,; SOUZA, L,C,F, de; MERCANTE, F,M,; RODRIGUES, E,T,; VITORINO, A,C,T, Inoculação do feijoeiro com *Rhizobium tropici* associada à exsudato de *Mimosa flocculosa* com diferentes doses de nitrogênio, *Bragantia*, v,68, n,2, 2009.