

# BEAN PLANT LINEAGES SUBMITTED TO THE NITROGEN FERTILIZATION AND TO THE *RHIZOBIUM TROPICI* INOCULATION

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## INTRODUCTION

The bean crop has great social and economic importance in Brazil, because besides guaranteeing income to the farmers, the bean is the major source of protein to the low income population. The crop yield is still low for lack of genetic materials of high productive potential and also due to the inadequate management of nitrogen fertilization. The objective of this work was to evaluate the yield of common bean lineages from Carioca group when submitted to the nitrogen fertilization and inoculation with *Rhizobium tropici*.

## MATERIALS 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 new beans lineages (Carioca group) tested were: CNFC 10429, CNFC 11944, CNFC 11945, CNFC 11946, CNFC 11948, CNFC 11951, CNFC 11952, CNFC 11953, CNFC 11954, CNFC 11956, CNFC 11959, CNFC 11962 and CNFC 11966. These beans lineages were compared to the commercial cultivars BRS Cometa, BRS Estilo, IPR Juriti and Pérola. The experimental design was in randomized blocks with three replications in a 17x2 factorial arrangement with 17 bean cultivars (14 new lineages and 4 commercial cultivars) and 2 ways of nitrogen supplying to the plant (mineral fertilization and biological fixation (BNF)). For the treatments with nitrogen fertilization, 40kg/ha of N were applied on the sowing and also in coverage 30 days after the germination, using urea as the N source. For the treatment with BNF, the seeds were inoculated with *Rhizobium tropici* strains CIAT 899 and PRF 81, as described by Pelegrin et al (2009). The characteristics evaluated were: number of pods/plant, number of grains/pod and grain yield.

## RESULTS AND DISCUSSION

For all variables studied were not observed significant differences between mineral nitrogen fertilization and bean seeds inoculation with *R. tropici* (table 1). This result matches with the ones found by Valadão et al (2009).

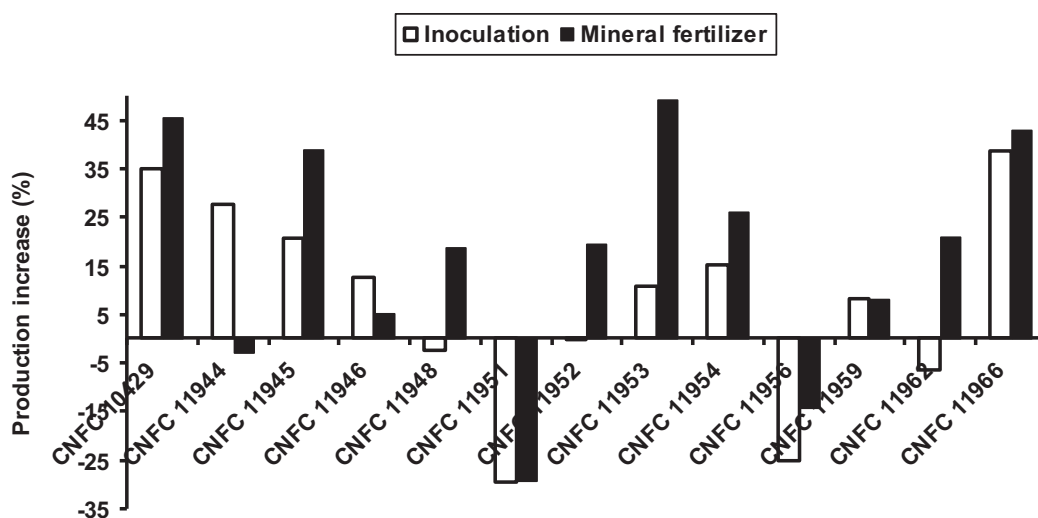
Considering the increase in the average production of the four commercial cultivars (control) was observed difference of behavior between the tested lineages (figure 1). The most of the lineages fertilized with mineral nitrogen presented positive responses when compared to the controls, highlighting the CNFC11953, CNFC10429 and CNFC11966. However, when was used just the inoculation with *R. tropici*, the lineages that stood out were: CNFC 11966, CNFC 10429 and CNFC 11944. In the Brazilian breeding programs of common beans, the selection pressure has been to the

response to mineral nitrogen fertilization. In this work there is evidence that inoculation with *R. tropici* is a viable alternative that should be considered.

**Table 1.** Mean values of pods per plant, number of grains per pod and crop yield from different beans lineages (Carioca group) under mineral nitrogen fertilization or seeds inoculation with *Rhizobium tropici*. Dourados, MS, Brazil. 2009.

Treatments	Number of pods/plant	Number of grain/pod	Yield (kg ha <sup>-1</sup> of grain)
Inoculated	12.64	3.03	2,327
Nitrogen fertilization	12.20	2.94	2,175
DMS	1.36 ns*	0.23 ns	269 ns
VC (%)	18	25	27

\*ns= not significant by Tukey test at 5% probability. DMS=difference minimum significant. VC= variation coefficient.



**Figure 1.** Mean values of the production of different lineages of common beans in relation to the average yield of four commercial cultivars (BRS Cometa, BRS Estilo, IPR Juriti and Pérola) used as control.

## CONCLUSIONS

The bean lineages CNFC 11953, CNFC 10429 and CNFC 11966 showed potential answer to the mineral nitrogen fertilization.

The lineages CNFC 11966, CNFC 10429 and CNFC 11944 presented potential to answer to the biological nitrogen fixation.

## REFERENCES

- PELEGRIN, R. de; MERCANTE, F.M.; OTSUBO, I.M.N.; OTSUBO, A.A. Resposta da cultura do feijoeiro à adubação nitrogenada e à inoculação com rizóbio. *Revista Brasileira de Ciência de Solo*.v.33, p.219-226. 2009.
- VALADAO, F.C. de A.; JAKELAITES, A.; CONUS, A.; BORCHART, L.; OLIVEIRA, A.A. de; VALADÃO JUNIOR, D.D.. Inoculação das sementes e adubações nitrogenada e molíbdica do feijoeiro-comum, em Rolim de Moura, RO. *Acta Amaz.*, Manaus, v. 39, n. 4, 2009.