RESPONSE OF COMMON BEAN TO DIFERENT DIAZOTROPHIC BACTERIA AND COVER CROPS

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INTRODUCTION

Nitrogen is a key limiting nutrient for agriculture. The association among diazotrophic bacteria and leguminous plants, such as common bean (*Phaseolus vulgaris* L.) allied to the use of green manures are important technologies on the basis of the sustainable agriculture. Many rhizobial strains have been indicated as common bean inoculants, however, their N_2-fixing efficiency are relatively low since the amount of the fixed N is not enough to plant growth (SILVA AND DEL PELOSO, 2006). In this way, the use of green manure may supply this lack of N necessary to reach the complete plant growth.

MATERIAL AND METHODS

Aiming to evaluate the effect of the inoculation with a commercial common bean inoculant and of a rhizobial strain from Embrapa Agrobiology, a field experiment was carried out at the National Rice and Beans Research Center of Embrapa, located in the county of Santo Antônio de Goiás, Goiás, Brazil. P-enriched (Pe) and P-non enriched (Pne) seeds of common bean, cv. BRS Ouro Negro, were inoculated with commercial common bean inoculant (BR 520 + BR 322) and Embrapa Agrobiology strain (BR 293) and planted after sunn hemp (*Crotalaria juncea*) and fallow (spontaneous plants). Three common bean plants were randomly collected per plot at the V4 stage to determinate the number of nodules (NN), the percentage of active nodules (%AN) with basis on the presence of leghemoglobin, the number of pods (NP), the number of grain per pod (NGP), the 100 grain weight (100GW), the leaf index area (LAI) and grain yield (GY) was determined at 13% of humidity.

RESULTS AND DISCUSSION

Common bean cropped after sunn hemp showed greater LAI, %AN, NP, 100GW and GY than after fallow (Table 1). According to STONE AND MOREIRA (2001), the use of sunn hemp as green manure can increase LAI and GY. Besides, greater GY could be also a result of a greater activity of the nodulation (%AN), although under green manure the contribution of the biological nitrogen fixation in relatively low (RONDON et al., 2006). This assumption was corroborated by the results of G under sunn hemp, in which it were not observed significant differences among seed treatments (Table 2). Under fallow, the inoculation of P-enriched seeds of common bean with the rhizobia strain BR 293 resulted in significant difference to Ni treatments, while commercial inoculant (BR520+BR322) did not show significant difference from these ones. Since BR329 was only different from Ni treatments when inoculated on P-enriched seeds, P-enrichment can be considered an efficient strategy to promote best N_2-fixing results.

Table 1. Stand (plants m^{-1}), leaf index area (LAI – m^2 m^{-2}), Number of nodules (NN – nº $plant^{-1}$), percentage of active nodules (%AN), Number of pods (NP - nº $plant^{-1}$), Number of grains (NG - nº $plant^{-1}$), 100 grain weight (100GW - g) and grain yield (GY – kg ha^{-1}) of common bean cropped under different cover crops and inoculants.

	Stand	LAI	NN	%AN	NP	NG	100GW	GY
Sunn hemp	8.50 a	0.80 a	45.46 a	67.96 a	7.28 a	3.85 a	25.77 a	2344.83 a
Fallow	8.39 a	0.55 b	37.80 a	54.44 b	3.70 b	3.88 a	22.38 b	1535.13 b
CV (%)	**11.83**	**27.11**	**30,03**	**24,44**	**27,36**	**11.83**	**9.62**	**22.34**

CV (%) – Coefficient of variation.
Values in the column followed by the same letter are not different by the Tukey´s test ($p<0.05$).

Table 2. Interaction of the cover crops and inoculation on the grain yield of common bean.

Cover crops	Seed treatments	Grain yield (kg ha^{-1})
Sunn hemp	BR293+Pe	2705.67 a
	BR520+BR322+Pe	2516.17 a
	BR520+BR322+Ni	2485.64 a
	BR293+Ni	2256.83 a
	Ni+Pe	2241.17 a
	Ni+Pne	1863.72 a
Fallow	BR293+Pe	2330.67 a
	BR520+BR322+Pe	1748.25 ab
	BR520+BR322+Ni	1703.33 ab
	BR293+Ni	1694.00 ab
	Ni+Pe	1011.75 b
	Ni+Pne	722.75 b
CV (%)		**22.34**

Ni – non inoculated, Pe – P-enriched, Pne – P-non enriched, CV (%) – Coefficient of variation. Values in the column, within cover crops, followed by the same letter are not different by the Tukey´s test ($p<0.05$).

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