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Assessment of Ecuadorian *Rhizobium* Isolates under Field Conditions

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Abstract

The study aimed to determine the influence of *Rhizobium* isolates on phenotypic parameters and yield of common bean (*Phaseolus vulgaris* L.) genotypes under field conditions. A total of seven strains previously isolated, characterised and genetically identified from soils of Loja province were inoculated on seeds of Mantequilla and Rojo Calima genotypes, besides the inoculation of wild type strain *Rhizobium etli* CNPAF512. A treatment with nitrogen fertiliser (application of urea 60 kg ha⁻¹) and a control without inoculation and fertilisation. Seeds were pelletized with the strains from the inoculants and planted in dry season on sandy loam soil. Nodulation parameters, plant biomass, yield components and agricultural yields were assessed. The results showed high capacity of nodule formation and biomass production by the treatments inoculated with isolates and wild type strain for both genotypes, compared with the native strains (control and mineral fertilisation treatments). *R. miluonense* (isolated from Catamayo), *R. tropici* (isolated from Saraguro) and wild type strain had a remarkable effect on these parameters. These treatments had similar behaviour for yield components, mainly in the number of pods and weight of grains per plant. The genotypic variability of the crop was higher for agricultural yields, where the best treats for Mantequilla genotype were obtained with *R. tropici* isolated and mineral fertilisation application, however no significant differences were observed among them. For Rojo Calima the wild type strain and *R. miluonense* showed the best results. This study validates the use of efficient interaction among *Rhizobium* species and bean genotypes to achieve yield increases through sustainable agricultural methods and to reduce the application of nitrogen fertiliser.

Keywords: Diazotrophic bacteria, inoculation, *Phaseolus vulgaris*, strains, yield