Effect of plant growth-promoting rhizobacteria on the growth of maize cropped in Southern Brazilian fields

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INTRODUCTION: The use of plant growth-promoting rhizobacteria (PGPB) inoculants is increasing lately due to higher costs of fertilizers, concerns over pollution and emphasis on sustainable agriculture. In this work we analyzed the effect of maize inoculation with *A. brasilense* strains and strains isolated from maize in our laboratories. MATERIAL AND METHODS: Maize (*Zea mays* L. 30F53H, Pioneer) was inoculated with the PGPR *A. brasilense* strains (AbV5 or HM053) or maize isolates (L26, L27, 8.1.2.1 or 4.3.3.1) + 30 kg ha⁻¹ N (30N). Eleven trials included non-inoculated controls containing 0, 30 or 160 kg ha⁻¹ N (0N, 30N or 160N, respectively) and inoculated controls, containing the commercial AzoTotal + 30N or 160N. The plots of 10m (length) x 3.2m (width), separated by rows of 0.8m, were set at Fundação ABC experimental station (25°00’50’’S, 50°09’18’’W), Ponta Grossa/PR, Southern Brazil and were evaluated regarding biometric parameters at V8 and R1 stages, macro and micronutrients leaf content at R1, and productivity at R6 stage. RESULTS AND DISCUSSION: PCA analysis of biometric parameters showed that the use of HM053, 8.1.2.1, AbV5 and L27 as maize inoculants are correlated with increase of leaf number, root volume, plant height, stem diameter and, stem, root and leaf dry mass at V8 and R1 stages. Though nutrient content in leaves were similar for all 30N treatments, inoculation with most of the strains increased the uptake of N, P, Ca, Mg, Cu, Zn, B. Additionally, strain inoculation with HM053 increased K, Fe and Mn. CONCLUSION: The 30F53H (Pioneer) maize cultivar showed to be responsive to the tested PGPR inoculants. Biometric analysis at V8 and R1 stages and leaf nutrient content at R1 suggested that HM053, 8.1.2.1 and L27 strains are good candidates for the development of commercial biofertilizers to the maize crop.

Key words: PGPR, inoculant, *Zea mays*, biometric analyses, V8 and R1 stages

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