

## Strain selection of growth promoting *Herbaspirillum* spp. in rice.

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Wheat, rice and maize are the most important cereals worldwide. However, in the last few years, soil has been submitted to both use and handling pressures due to the increase in agricultural practices, which are leading to its degradation (Bonilla 2000). The use of plant growth-promoting bacteria as inoculants constitutes a biological alternative for sustainable production. Strains of *Herbaspirillum* spp. are able to fix nitrogen and produce plant growth promoting compounds (Figueiredo 2008). Through the combination of these mechanisms, the association with some crops can be beneficial for plants of agricultural importance, and therefore contribute to reduce the use of chemical nitrogen. The aim of this work was to select strains of *Herbaspirillum* spp. able to promote the growth of rice plants of El Paso 144 variety. A total of 113 diazotrophs were isolated from aerial tissue of several varieties and crop phenological stages (Dobereiner 1995). Eleven isolates were characterized as presumptive *Herbaspirillum* spp. (Baldani 2000; Estrada 2001). Of these, two isolated from vegetative stage (9.4 and 4.2) produced significant increases in shoot dry matter under controlled conditions. These isolates were tested in greenhouse assay with and without nitrogen. Plants colonized by 4.2 showed a significantly higher root biomass both in presence of 50% from recommended doses of nitrogen (100 kg/Há), or its absence. It also showed a significant plant growth-promoting effect of 4.2 that was reflected in the yield, using a split plot design, with smaller plots and three replications random. Inoculated and non inoculated treatments were carried out with different doses of nitrogen fertilization. There was an increase in yield of 16% of the inoculated treatments respect to no inoculated. The 16S rRNA sequence indicated that 4.2 strain belongs to the genus isolated *Herbaspirillum* spp. Therefore, we conclude that *Herbaspirillum* spp. strain 4.2 has a potential use as a reasonable alternative for crop production, with a minimization of the ecological impact.

Baldani et al (2000). *Biology and Fertility of Soils*. 30: 485-491.

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Estrada et al (2001). *Applied and Environmental Microbiology*. 67: 2790-2798.

Figueiredo et al (2008). *Guaíba: Agrolivros*. pp. 568.