

**TITLE:** EFFECTS OF DIFFERENT COINOCULATION PRACTICES USING *Bradyrhizobium japonicum*, *Bacillus subtilis* AND *Bacillus pumilus* ON SOYBEAN CROPPING

**AUTHORS:** MAGRO, M. R.; MACIEL, J. F. S.; CLAMER, J. C. A.; KLEINSCHMITT, E.; FRANÇA, A. R. S.; DA CRUZ, S. P.

**INSTITUTION:** UNIVERSIDADE FEDERAL DE SANTA CATARINA, CURITIBANOS, SC (RODOVIA ULISSES GABOARDI KM 3, CEP 89520-000, CURITIBANOS-SC, BRASIL)

**ABSTRACT:**

Different inoculation practices are world-wide studied, and among those, the post-emergence is one of the most noteworthy methods. It consists in spray-applying inoculant on soil after plant emergence, what guarantees no physical contact between bacteria and fungicides that are seed-applied and could otherwise cause bacterial mortality. The goal of this study was to evaluate the effects of post-emergence inoculation compared to seed inoculation using the species *Bacillus subtilis* and *Bacillus pumilus* associated to *Bradyrhizobium japonicum*. We assessed nodulation, plant growth and also grain yield. The study was conducted under field conditions in the city of Curitiba – SC. The experimental design was completely randomized blocks with seven treatments and five repetitions: T1 - control; T2 – nitrogen fertilization; T3 - *Bradyrhizobium japonicum* on seeds; T4 - *B. japonicum* + *Bacillus subtilis* on seeds; T5 - *B. japonicum* on seeds + *B. subtilis* after emergence; T6 - *B. japonicum* + *Bacillus pumilus* on seeds; T7 - *B. japonicum* on seeds + *B. pumilus* after emergence. All post emergence inoculation procedures were performed at V3 stage. Bacteria inoculants were developed and provided by Total Biotecnologia (Curitiba, PR). Overall mean of nodules was 62  $\text{pl}^{-1}$ , and no difference was observed among treatments. Nodule dry biomass was higher in T3 (192mg  $\text{pl}^{-1}$ ) compared to T4 (130mg  $\text{pl}^{-1}$ ). Greater shoot dry biomass was registered with nitrogen fertilization (6.96g  $\text{pl}^{-1}$ ), similar to values from T3 (6.16g  $\text{pl}^{-1}$ ), T4 (6.30g  $\text{pl}^{-1}$ ) and T6 (6.32g  $\text{pl}^{-1}$ ). The highest yield mean was found in T3 (5514kg  $\text{ha}^{-1}$ ) compared to T6 (4512kg  $\text{ha}^{-1}$ ), when *B. pumilus* was seed-applied. Based on current findings, coinoculation of soybean with *B. japonicum* and either *B. subtilis* or *B. pumilus* increased shoot dry biomass. Inoculation of seeds with *B. pumilus* did decrease grain yield. Post-emergence inoculation using both species of *Bacillus* did not promote any benefit to the evaluated parameters. Therefore other doses and forms of application should be further tested in order to obtain more consistent results about the potential of using these species of *Bacillus* as commercial inoculants.

**Keywords:**, *Bacillus subtilis*, *Bacillus pumilus*, *Bradyrhizobium*, Coinoculation, Soybean

**Development Agency:** Total Biotecnologia, Curitiba-PR