

## Isolation and Screening of Effective Native *Rhizobium* Strains for Soybeans Grown in the Dry Zone of Sri Lanka

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Soybean is cultivated worldwide using *Bradyrhizobium* inoculants with low nitrogen inputs. This study aims to identify indigenous *Bradyrhizobium* strains to be used as effective inoculants for soybean. Four strains of indigenous *Bradyrhizobium* (T5-T7) isolated from root nodules and rhizosphere soil of soybean were assessed under field conditions with 50% urea cut down and compared with no fertilized control (T1), non-inoculated fertilized control (T2), and farmer practice (T3). Plant samples were taken on the 4<sup>th</sup>, 6<sup>th</sup> and 8<sup>th</sup> weeks after seeding and assessed for dry weight, shoot nitrogen uptake, and nodules. Data were subjected to Analysis of variance using SPSS statistical software. Shoot dry weight was significantly higher in treatment added with inoculant 4 (T7) at the 4<sup>th</sup> (13.10g) and 6<sup>th</sup> weeks (25.21g) of seeding than other treatments. The same treatment showed significantly higher total nitrogen in the shoot (66.41 g kg<sup>-1</sup>) at 4<sup>th</sup> week and weight of fresh nodules (0.69 g) at the 6<sup>th</sup> week over other treatments. The dry weight of pods was significantly higher in T7 (12.84 g) compared to the other treatments. Correlation analysis indicated that the shoot and root growth depend on total N uptake ( $r = 0.81$  and  $r = 0.85$  respectively) and spade meter readings ( $r = 0.60$ ). At the 6<sup>th</sup> week, shoot growth was correlated with the weight of good nodules ( $r=0.81$ ) and dry weight of pods ( $r=0.76$ ). Results indicated that four *Bradyrhizobium* isolate survived in the experimental field and developed effective root nodules contributing to a significant increase in N uptake, growth, and yield enhancement of soybean with a 50% cut down of urea. There is a high potential to use the seed inoculant at a commercial scale following testing at farmer fields.

**Keywords:** *Bradyrhizobium*, Inoculants, N<sub>2</sub> fixation, Screening, Soybean

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