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Effect of saline and saline-sodic soils on soil *Rhizobium* population and yield of soybean

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SUMMARY

A pot culture experiment was conducted to study the effect of saline and saline-sodic soils on *Rhizobium* population and its influence on growth and yield of soybean during *Kharif*-2008, in the Department of Soil Science and Agricultural Chemistry at Mahatma Phule Krishi Vidyapeeth, Rahuri. The maximum rhizobial population and root nodulation was observed in normal soil with low pH and lower salt concentration. The pH of this soil was observed to be favourable for the microbial growth. The soil rhizobial population was lower in saline soil than the normal soil due to increased pH and high salt concentration. A significant increase in yield was also observed by *Bradyrhizobium* seed inoculation in saline-sodic soils over the uninoculated treatment.

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KEY WORDS : Salinity, Bradyrhizobium inoculation, Soybean, Saline-sodic soil, Salt concentration

Soybean [*Glycine max* (L.) Merrill] is one of the most versatile crop yielding oil and protein across a wide range of the environmental conditions.

In India area under soybean was 7.17 million ha, with production and productivity of 8.27 MT and 1073 kg ha⁻¹, respectively. In Maharashtra area under soybean was 2.34 million ha with production and productivity of 2.52 MT and 1077 kg ha⁻¹, respectively (Anonymous, 2006).

The role of legumes in improving soil fertility was known much earlier, however, the main responsible bacteria for N fixation *Rhizobium* was isolated and identified later. Presently there are more than seven known cross inoculation groups, based on host specification. The taxonomy of root and stem nodulation bacteria is now in a state of transition. The latest system of classification (Jordan, 1984) divides root nodule bacteria into two genera *Rhizobium* and *Bradyrhizobium*, based on mole per cent G + C values in DNA, numerical taxonomy, serological relationships and other characteristics. The soil properties largely influence the rhizobial population, root nodulation, which significantly reduce the soybean yields.

EXPERIMENTAL METHODS

A pot culture experiment was conducted with three different soils having varying soil reactions. Soybean was grown as a test crop in pot culture experiment and the effect of varying soil properties on *Rhizobium* population were studied under green house condition during *Kharif* 2008 at the Department of Soil Science and Agricultural Chemistry, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri.

Three different soils namely normal soil of order Vertic Haplustept, saline soil of order Lithic Haplaquent and saline-sodic soil of order Vertic Halaquept were collected for pot culture experiment.

The experiment was conducted in a Factorial Completely Randomized Block Design with four replications. Each replication consisted of three soil types. Each soil type consisted of two sub-treatments *i.e.*

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