

**NODULATION NITROGEN FIXATION AND RHIZOBIOLGY OF  
WINGED BEAN (PSOPHOCARPUS TETRAGONOLOBUS (L) DC.)**

T.I.L. Wijesundara, S.A. Kulasooriya\* and R.B. Marasinghe  
Institute of Fundamental Studies, Kandy,  
\*Dept. of Botany, University of Peradeniya.

Five varieties of winged bean (UPS 139, TIS 0078, TIS 0100, UPS 122 and SLS 40) grown in mid-country intermediate zone (Ultisols) were used in this study. The acetylene reduction activity (ARA) was measured and rhizobia strains were isolated from nodules at five different developmental stages of the plant. The total viable bacteria count (TVC) and the native rhizobia population were estimated at each harvest by most probable number method (MPN). Two hundred and fifty isolates were tested at pH 4.5 and pH 8.5. The 35 isolates that showed tolerance to these pH levels were authenticated on the original winged bean cultivars and their nitrogenase activity was measured.

The MPN test revealed that the rhizosphere rhizobial population increased upto mid-flowering. Then there was a decline, except in SLA 40, where the population remained somewhat constant. The TVC also showed a similar trend. The highest nitrogenase activity per plant was recorded at the flowering stage. However, the highest specification ARA (per/g wt. nodule) was observed at nodule initiation. This indicates that the younger nodules per se fix nitrogen at a higher rate and the activity per plant has increased primarily due to the production of more nodules at flowering.

Out of the 35 purified strains screened for tolerance to pH, 18 were found to be base tolerant (pH 8.5) while 12 showed a wider range of tolerance (pH 4.5 - 8.5). The corresponding nitrogenase activities on the host plants showed 5 isolates with very high nitrogenase activity and a wide range of pH tolerance (4.5 - 8.5). Assessment of infectivity of 4 of the above 5 isolates in comparison with highly efficient reference cultures (TAL and KUL) have shown that 3 of them are as infective as the reference control strains.