

## RESEARCH ON BIOLOGICAL NITROGEN FIXATION

S.A. Kulasooriya

*Senior Research Fellow/Professor*

During the year under review, more work has been done on associative nitrogen fixation and a flood-tolerant, stem-nodulated legume, than on cyanobacteria and rhizobia.

Of the 15 N-fixing bacterial types isolated from roots of wetland rice, one isolate consistently showed high nitrogenase activity in association with modern, high-yielding, local varieties of rice. This organism is an alkali producer, capable of utilizing  $\text{NH}_4$ ; possesses both assimilatory and dissimilatory  $\text{NO}_3$  utilizing pathways; and appears to be a member of the Enterobacteriaceae. It was observed to aggregate within the mucigel of rice seedling roots, induce curvatures in them, and produce growth-promoting substances. This bacterium, when inoculated into rice seedlings, stimulated their root growth and dry matter production.

The use of the flood-tolerant, stem-nodulated N-fixing legume *Sesbania rostrata* has a limitation because it flowers early under tropical conditions. Once they enter the reproductive phase, such plants produce less-vegetative biomass. A series of field experiments showed that flowering could be delayed by decapitating young plants, which sprouted several lateral branches, resulting in the increase in dry matter yield, stem nodulation nitrogenase activity, and N-yield. Thus, pruning of young *Sesbania* plants could be a practical way of increasing their potential as a green manure.