SECTION D

A LABORATORY EVALUATION OF RHIZOSPHERE NITROGEN FIXATION ASSOCIATED WITH WETLAND RICE

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Of the techniques so far reported for the detection, estimation and isolation of rhizospheric diazotrophic bacteria from Wetland rice, the most promising one involves an initial assay for nitrogenase activity by the cut-plant method (Barraquio et. al., 1986) followed by a more specific method of isolation using a spermosphere model (Thomas - Bauson et. al., 1982). In this investigation, field grown plants of a new-improved, short-age variety of rice, namely, Bg 400-1, grown in two different localities under similar agronomic practices were used. The cut-plant technique was employed to estimate the rates of biological nitrogen fixation at early flowering.

The sample with the highest total rhizosphere activity was used for the isolation and characterisation of the most prevalent nitrogen fixing organisms in the rice rhizosphere. A sub-sample of the roots and the adhering soil was macerated, a series of dilutions of the macerate was made and the spermospheres were inoculated with a known volume of each of the dilutions. The spermospheres were incubated at room temperature for 10 days and the ARA was measured by gas chromatography. The spermospheres giving the highest ARA were used for isolation of the dominant nitrogen fixing organisms. Several different aerobic media were used for isolation of these organisms. The most dominant population was recognized to be a single-celled, coccoid organism forming transparent, slightly yellowish round colonies on Watanabe medium (Watanabe & Barraquio, 1979). These cells were observed to produce large capsules with single cells or pairs of cells in older cultures. This organism was tentatively identified as an enterobacteriaceae and will be used for further evaluation of rhizosphere nitrogen fixing activity.

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References

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