

### **Estimation of bacterial numbers in lowland rice soil using Epifluorescent Direct Bacterial Counts and Total Biomass Measurements**

Soil Microbial communities are extremely diverse, and the quantification of bacterial numbers and biomass important to understand the ecological role of bacteria in a soil. Present preliminary investigation done with lowland rice soils, showed a relationship between direct counts of bacteria obtained by a standard method. These observations were done during a long term field investigation on improvement of rice soil fertility and its biology with the organic matter use.

DAPI fluorochrome was used in the Epifluorescent direct method according to Kepner & Pratt (1994). Indirect bacterial biomass was obtained according to Öhliger (1996). The main field experiment was done according to a RCBD with a nested treatment arrangement in the Intermediate zone of Sri Lanka. Samples were collected 4 times [(S<sub>1</sub>) to (S<sub>4</sub>)], every 30 days in one rice cultivation season from 3 weeks before ploughing from blocks at 3 different locations. Immediately after collecting, every soil sample was fixed for microbial counting. Only a preliminary observation is reported here.

Counts of bacteria ( $\times 10^6$ ) per 1g (dw) of soil has varied from 1.69 to 1.09 in S<sub>1</sub> from 3.84 to 2.29 in S<sub>2</sub>, from 1.73 to 1.17 in S<sub>3</sub> and from 1.62 to 1.06 in S<sub>4</sub> with the soil depth from surface (0 to 12 cm). Microbial biomass C in mg/ L has varied from 3.17 to 1.35 in S<sub>1</sub>, 6.41 to 2.71 in S<sub>2</sub>, 3.25 to 1.49 in S<sub>3</sub>, and 3.01 to 1.26 in S<sub>4</sub>.

According to the epifluorescent direct count method, population of total soil bacteria was maximum at S<sub>2</sub> which was just after ploughing. Total soil bacterial density decreased from S<sub>2</sub> to S<sub>4</sub>. It increased from S<sub>1</sub> to S<sub>2</sub>. The pattern of variation in bacterial biomass was also the same as above. Value of S<sub>2</sub> was significantly different from S<sub>1</sub>, S<sub>3</sub> and S<sub>4</sub> in the estimation of both methods.

Above pattern was similar for all three locations. These time curves also showed that ploughing has increased the total number of soil bacteria and their activity. However, epifluorescent direct counting method gives a reliable result than the values given from biomass, since the epifluorescent method gives total bacterial cell counts existing at the time of sampling. According to the above observations, it appears that the bacterial biomass is directly proportional to the bacterial counts. A correlation analysis is required to be done to confirm this relationship.