

D-15: Importance of protozoa in limiting the size of bacterial population in paddy field soil

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The role of soil protozoa in relation to bacterial activity and hence soil fertility was not clearly understood. There was one belief suggesting an adverse effect on bacteria and hence soil fertility. Another belief has grown that the role of protozoa was beneficial rather than adverse. Information with respect to situations encountered with water-logged conditions existing in paddy field soils was not available.

13 protozoa and 13 bacteria isolated into exenic cultures from paddy soils were used for investigating the role played by paddy soil protozoa in limiting bacterial activity.

Daily counts of bacteria were obtained using the pour-plate method for a period of 24 days from artificially created environments resembling paddy soils inoculated separately with: flagellates and bacteria; ciliates and bacteria; amoebae and bacteria; all protozoa collectively as a mixed population and bacteria and only bacteria without protozoa.

An increase in abundance of bacteria was observed initially in most cases followed by a decrease and stabilization. The results showed the influence of the different protozoan groups individually and collectively on bacterial

numbers. Flagellates were most influential in limiting bacterial numbers followed by amoebae and ciliates though not as pronounced as the effect of flagellates. All these groups of protozoa individually, showed a controlling effect on bacterial counts well below the norm, i.e. without any protozoa. The mixture of protozoa however, appeared to negate the effect of individual protozoan groups where the bacterial counts were observed to be higher with this set up than when alone. This indicated that there could be no limitation imposed by presence of protozoa. In the absence of protozoa too, the bacterial numbers increased initially, then decreased and stabilized after some time. Though after stabilization, the bacterial numbers were observed to be lower than with the protozoan mixture. Therefore it was apparent that the effect of protozoa on bacteria was neither beneficial nor adverse initially but in the long run, the effect of protozoa was more beneficial.

The study revealed that in paddy field soils, the mixed protozoan population acted as an important and effective regulator of bacterial activity in increasing their numbers as against individual protozoan types which caused a limitation in bacterial activity.