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Microbial Ecology Associated to the Coral Recruitments Dynamics in Southern Sri Lanka

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Abstract

Coral reefs are made by coral organisms, and they produce their mineral substrate. Coral reefs are formed of colonies of coral polyps held together by calcium carbonate. The coral reefs ecosystems were lost due to the summation of both natural and anthropogenic activities. Coral recruitment is a critical process. Helps maintain coral populations and facilitates recovery after a disturbance by ultimately influencing abundance and species composition. This study was carried out to find recruitment patterns of reef building corals and other associated organisms and microbial ecology at the time with relation to coral recruitment. Five tiles were deployed in each 3 locations after one-month preconditioning (Depth~4 m). Tiles were collected back within 3-week intervals. Bacteria colonization and direct counts were observed using culture media plates and epifluorescence microscopy respectively. Epiphytic organisms were observed in tiles and counted to determine coverage analysis. Coral Crustose algae (CCA) were dominant among them. According to results, after 6 weeks of deploying, newly recruited corals were observed and identified as *Pocylophora* sp. and *Goniastrea spp.* Coral recruitment did not show difference between study sites ($p>0.05$, $p=0.145$) but showed positive relationship with time ($p<0.05$; $p=0.032$, $R^2=79.4$). And total bacteria count ($p<0.05$, $p=0.000$). And virus count ($p<0.05$, $p=0.013$) in tile and water column showed the significant difference between study sites. Paraviwella showed highest bacteria and virus count in water column and highest bacteria count in tiles while Waligama showed highest virus count in tiles. It may be due discharges from Tangalle harbor may contaminate with water and due to basin topography of Paraviwella reef area bacteria and viruses remained in high concentrations. Pathogenic bacteria in tiles (*Vibrio* sp. *Escherichia coli* and *Shigella* sp.) were not significantly different between sites and do not show any relationship with coral recruitment. CCA cover did not differ between study sites but showed a positive relationship with coral recruitment. Terracotta tiles were able to recruit coral within a low time period like 2 to 3 months. Out of all sites Polhena was the most suitable site with relatively faster for coral recruitment.

Keywords: Coral recruitment, Terracotta tiles, Microbial ecology, Virus, CCA