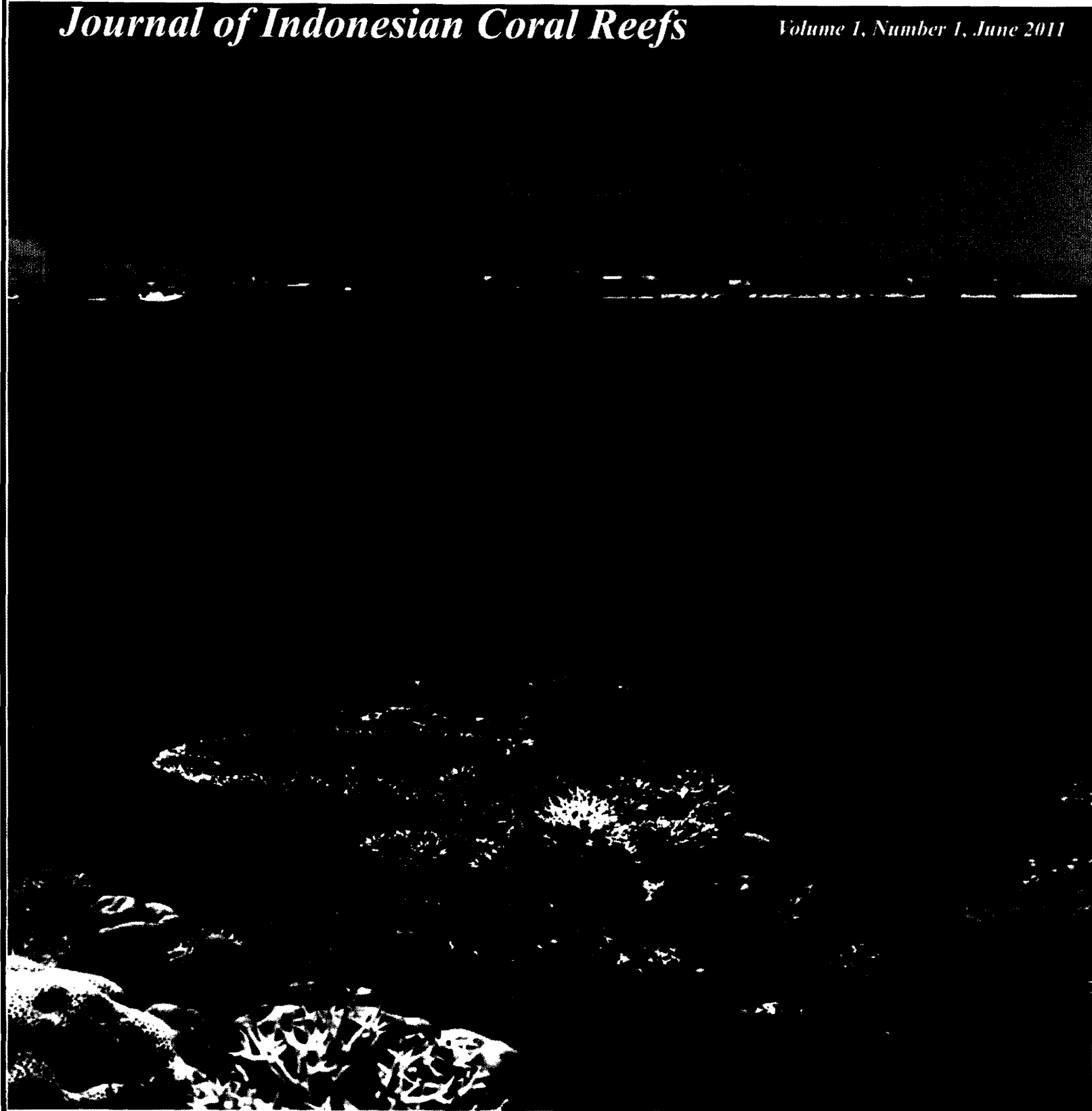


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Journal of Indonesian Coral Reefs (JICoR)



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Preface

Indonesian coral reefs comprise the largest and most diverse coral reef ecosystem on the planet, but at the same time, they are among the most threatened due to mounting human- and climate change-related stressors. In the last few decades, many coral reefs in the region have been significantly degraded by a range of activities and disturbances, including destructive fishing, coral mining, sedimentation, and recently, by warm temperature anomalies causing coral bleaching. For Indonesia, whose population is spread across an archipelago of islands, and where millions of people depend on coral reefs for food and livelihood, the degradation of coral reefs represents a serious threat to the economy of the nation.

In recognition of the significant economic value of Indonesian coral reefs and the high dependency of Indonesian people on reef resources, several management efforts involving a variety of programs, especially the Coral Reef Rehabilitation and Management Program (COREMAP), have been ongoing since 1998. A new regional program called the CTI-CFF (Coral Triangle Initiative for Coral Reefs, Fisheries, and Food Security) emerged in 2009 and is also focused on protecting our invaluable resources. Despite these and other management efforts, ongoing and emerging challenges relating to the protection and sustainable use of these resources remain to be resolved, and will require strategic management actions based on strong scientific research and principles.

Recognizing the urgent need to provide and share scientific data and information to improve coral reef management, the Indonesian Coral Reef Society (INCRES), in collaboration with the Research & Development Center for Marine, Coastal, and Small Islands (MaCSI), Hasanuddin University, have joined forces to jointly publish the Journal of Indonesian Coral Reefs (JICoR). This is the first journal especially dedicated to and focused on publishing interdisciplinary research related to Indonesian coral reefs.

This first volume of JICoR covers a number of crucial issues pertaining to coral reefs, particularly examples of strategies for coral reef management, the status of coral reef charismatic species, marine protected areas, coral biology, coral diseases, coral reef ecology, and socio-economic aspects of coral reefs to highlight some of the contributions. We hope that the presence of JICoR will enrich and progress academic research related to Indonesian coral reefs, and become an invaluable repository of knowledge for the development of basic and applied research, as well as a source of strategic and unbiased information for improving coral reef management in Indonesia.

Editor in Chief,
Jamaluddin Jompa

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Coral Settlement on Concrete Artificial Reefs in Pramuka Island Waters, Kepulauan Seribu, Jakarta and Management Option

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Abstrak

Tahap akhir perkembangan komunitas karang rekrut pada terumbu buatan beton telah diamati selama sembilan bulan (Oktober 2009-Juli 2010) menggunakan metode sensus visual dan fotografi bawah air. Sejumlah sepuluh unit terumbu buatan beton yang telah ditenggelamkan di perairan Pulau Pramuka dan Gosong Pramuka pada tahun 2001 digunakan sebagai objek pada penelitian ini. Sebagai perbandingan, kondisi persen tutupan karang dan ikan karang di terumbu karang alami juga diamati menggunakan metode transek garis menyinggung, transek kuadrat, sensus visual dan fotografi bawah air. Untuk menghitung luas tutupan karang digunakan software ImageJ versi 1,42q. Pada Maret 2010, sejumlah 457 koloni karang dari 21 genus dan 216 koloni karang dari 16 genus ditemukan berturut-turut di Stasiun 1 (Pulau Pramuka) dan Stasiun 2 (Gosong Pramuka). Jumlah koloni karang rekrut didominasi oleh genus Porites, Pocillopora, dan Cyphastrea. Pada Juli 2010, persen tutupan karang rekrut pada terumbu buatan beton mencapai $41,46 \pm 13,37\%$ (rerata \pm Sb) di Stasiun 1 dan $20,38 \pm 6,08\%$ (rerata \pm Sb) di Stasiun 2. Genus Porites menjadi yang paling dominan di kedua Stasiun dalam hal kelimpahan koloni rekrut dan persen tutupan. Hasil ini menunjukkan bahwa terumbu buatan beton dapat digunakan secara efektif untuk membuat habitat baru bagi karang, ikan karang, dan biota lainnya terutama pada ekosistem terumbu karang yang telah rusak.

Kata kunci : terumbu buatan, rekrutmen karang, ikan karang, rehabilitasi karang

Abstract

Latest stage development of recruit corals community on concrete artificial reefs were observed for nine months (from October 2009 to July 2010) by visual census and underwater photography methods. Amounts of 10 units of concrete artificial reef deployed in Pramuka Island waters and Gosong Pramuka in 2001 were used as an objects in this research. As a comparison, the condition of coral cover and reef fishes in natural reef were observed by line intercept transect, visual census, and underwater photography methods. In order to measure coral coverage area we used ImageJ 1.42q software. In March 2010, amounts of 457 coral colonies from 21 genera and 216 coral colonies from 16 genera were found on artificial reefs surface in Station 1 (Pramuka Island) and Station 2 (Gosong Pramuka) respectively. Number of recruit coral colonies was dominated by genus Porites, Pocillopora, and Cyphastrea. In July 2010, the percentage of coral cover on concrete artificial reefs reaches $41.46 \pm 13.37\%$ (mean \pm SD) in Station 1 and $20.38 \pm 6.08\%$ (mean \pm SD) in Station 2, while the percentage of coral coverage on natural reefs were 23.14% and 40.43% in Station 1 and 2 respectively. Genus Porites become the most dominant genus in both of stations in terms of recruit colony abundance and percent cover. This result shows that concrete artificial reefs can effectively use to create new habitat of corals, coral fishes and others biota particularly in degraded coral reefs ecosystem.

Key words : artificial reef, coral recruitment, coral fishes, coral rehabilitation

apparently more influenced by environmental factor and the condition of deployment site, such as sedimentation rate, magnitude of currents and waves, ammonium and silicate contents, competition with macroalgae and soft coral, and the lowness of herbivory fishes abundance which is grazing on algae.

Despite of artificial reef ecologically effective as coral rehabilitation method, the cost needed to execute coral rehabilitation by artificial reef, particularly in small islands is relatively expensive. Therefore, coral rehabilitation program using concrete artificial reefs needs appropriate planning, so that artificial reefs can function effectively. In order to achieve optimal total economic value from concrete artificial reef deployment, there are several requirements which have to be fulfilled in the policy making process. The first is suitability of water environment to support coral life and growth. The second is availability of coral larvae supply as a source of natural recruitment. The third is the existence of obstacle for coral larvae to settle naturally (natural recruitment) because of unstable substrate or substrate diameter which is too small.

CONCLUSION

1. Concrete artificial reef is able to improve natural coral reef condition and increase percent cover of live coral on degraded coral reef ecosystem.
2. Concrete artificial reef can effectively functions as new habitat of coral fishes (as fish shelter and feeding ground), particularly on the degraded coral reef ecosystem.
3. Concrete artificial reef type of partial pyramide is quite effective to be applied in coral reef rehabilitation in order to accelerate degraded reefs recovery, if only their requirements are fulfilled.

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