

APPEARING COASTAL ANIMALS AND THEIR MOBILITY IN ARTIFICIAL PEBBLE AND ROCK BEACH

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Recently in Japan, many artificial tidal flats and rock beaches were constructed to restore the lost nature. However, there are few observations to monitor the reproduced nature in such works for a long time. An observation of lives and water quality was performed in an artificial pebble and rock beach. In this study the appearing coastal animals were discussed. The artificial pebble and rock beach was constructed 5 years ago near Akashi-Kaikyo-Ohashi suspension bridge in Japan. The beach is located west of Kobe, facing the Akashi strait in the Seto Inland Sea. The beach consists of two parts, an offshore deep basin (2.0m depth) and an inshore shallow pool (0.5m depth). The bed in the shallow pool is covered with pebble of about 2cm diameter. The shallow pool was designed to be calm for safety of citizen.

The observation has been done at two points in the shallow pool and along one line in the deep basin on the water quality, appearing seaweed and coastal animals. In the shallow pool the coverage by and the biomass of appearing coastal animals were observed, while in the deep basin only the coverage was observed. In the shallow pool the value of the coverage by the appearing animals was from 0 to 4 %, and the number of species of appearing animals was from 0 to 4.5 in average. In the deep basin they were from 5 to 47 % and 3 ~ 6.5 respectively. The values of coverage in the shallow pool were about 1/10 of the values in the deep basin. The value of biomass in the shallow pool was from 0.05 to 13.4 g/m².

For comparison, these results are compared with the observation data in a natural beach on the northeast coast of Awaji Island and around a coastal structure near the artificial beach. In the natural beach, the observation of the coverage was not done. The value of the coverage by the animals around the structure was from 9 to 38 % and the number of the species was from 4 to 6. They were nearly same as in the deep basin of the artificial beach. The value of the biomass was from 39 to 1955 g/m² in the natural beach and was from 288 to 415 g/m² around the coastal structure. The maximum values were 30 to 150 times higher than the maximum value in the shallow pool. From the comparison on the quantity, the shallow pool is very poor compared with in the deep basin and the natural beach and around the structure.

It is said that the inorganic environment and the interaction among the lives decide the appearing species. The causes of the poverty of the shallow pool are investigated from the constitution of the appearing species. The most well-known interaction among lives is food chain. At first, the coastal animals appearing in the basin and pool are classified from the view point of the feeding habit. About 80% of the total coverage in the deep basin and around the structure is occupied by the suspension feeder. While in the shallow pool from 40% to 60% of the total coverage is occupied by the suspension feeder. The biomass in the shallow pool is occupied

predominantly by the grazer and the carnivor, while that in the natural beach and around the structure is occupied predominantly by the suspension feeder. From the viewpoints of feeding habit, the rate of occupation by the suspension feeder in the shallow pool is smaller than that in the deep basin and the natural beach and around the structure. But this is not so clear difference.

For a further consideration, their mobility is added to classify the coastal animals. It is found that in the shallow pool the mobile animals of grazer, carnivor and scavenger types occupy a great portion of appearing animals. While in other places the sessile type animals occupy a grate portion. This is a clear difference between in the shallow pool and other places. The reason may be that it is calm and easily dried up in the shallow pool for the sessile type animals to live. Also it is suggested that the carnivor type animals eat the larva of sessile animals before growing up in the shallow pool.