sediments for constructing an artificial tidal flat.
The purpose of this study was to evaluate the environmental conditions of the constructed tidal flat over two years after it was built. We monitored the biological characteristics (restoration of macrobenthos and growth of bivalve) and physico-chemical parameters (oxidation-reduction potential, acid volatile sulphide, loss on ignition, water content, total organic carbon, total nitrogen, chlorophyll a, and particle size) for five types of constructed tidal flats and a natural tidal flat. At the same tidal situation, the physico-chemical parameters were almost similar among the five constructed and natural tidal flats. However, the biomass and macrobenthic population in the constructed flats was higher compared to the natural one. Moreover, it was observed that the results for the young short-necked clam indicated remarkably larger growth in the artificial tidal flat relative to that obtained in the natural one. From this result, it was supported that the muddy solidified sea bottom sediments were very effective for the excellent growth of the young clams. These observations may be considered to be attributable to the minerals which were supplied from the solidified sea bottom sediments. These solidified materials would give the good ecological conditions to benthic animals. The muddy dredged sediments generated by the HBS could provide useful materials for enhancing the productivity of the tidal coast in order to create new environment.
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Isotopic evidence of seasonal variation in feeding niche of river and brackish gastropods

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Dynamics of organism's feeding niche in response to environmental changes is of fundamental importance for understanding determinants of community structures and diversity. Feeding niche can be examined by stable isotope analysis. At a downstream bank of Yura River, Kyoto, Japan, feeding habit of three common gastropods and their possible food were studied using ^{13}Carbon and ^{15}Nitrogen stable isotopes. Anadromous gastropod *Clithon retropictus* depended mostly on benthic microalgae and marine POM as source of nutrition. It utilized about 65% benthic microalgae in spring and slightly decreased to 62% in summer while marine POM in its diet increased from 25% in spring to 30% in summer. Marine water enters Yura estuary and intrudes midstream from spring to summer, making oceanic phytoplankton available as part of the diet of *C. retropictus*. *Cipangopaludina japonica* and *Semisulcospira libertina* which are both freshwater gastropods change diet from spring to summer. In spring, *C. japonica* consumed about 67% from organic matter of the sediment but shifts its diet to river POM (68%) in summer. A wider food spectrum is consumed by *S. libertina* in spring; about 27% river POM, 25% sediment POM, 24% estuary POM and 16% microalgae. In summer, it shifts its diet to mostly river POM (71%).
To understand the dynamics of feeding niches of the three river gastropods, we measured and analyzed stable Carbon isotope trends of the five possible food items in the study site. Stable isotope ^{13}C of microalgae had enriched greatly from spring to summer, from -25% to -17% which indicated the presence of marine-origin epiphyton. The same trend was observed in sediment POM which increased from -26% to -22%. River POM showed the opposite trend, ^{13}C decreased from -24% to -27% from spring to summer which indicated more influence of terrestrial-origin materials in the river freshwater during summer. Marine and estuarine POM showed relatively constant ^{13}C values in the two seasons (-22% and -24% respectively).
C. retropictus utilized marine POM aside from benthic microalgae. Although marine-origin materials are more available in summer due to marine water intrusion, *C. japonica* and *S. libertina* still selected terrestrial-origin materials either from river POM or sediment POM. Shift, expansion and overlapping of feeding niches were thought to be responses to food availability, competition and water dynamics in the estuary. River discharge and movement of marine water into the river may play an important role in the temporal change of feeding niches of the gastropod populations. This has implication on the diversity and management of river and estuary systems.

Evaluation of restoration effect in the coastal unused reclaimed area by promoting sea water exchange in Ago Bay, Mie Prefecture, Japan