A Comparative Study of Distribution Pattern of Two Endangered Benthic Animals on Artificial and Natural Tidal Flats

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The Ohgata tidal flat located on the east of Shikoku Island in southwestern Japan, was accidentally created by dredged materials from the nearby shallow bottom and by mountain soils in the course of the land reclamation for the Ohgata fishing port enlarging project. The particle size distribution was quite different between these two sediment types: dredged materials consisted of >90% of the silt and clay content, mountain soils consisted of >70% coarse grains (from 75mm to 75μm in diameter). At present, after about 15 years from the last reclamation, many animals including 15 endangered species are found in the artificial tidal flat. In particular, two endangered species, the fiddler crab *Uca arcuata* and the mud snail *Cerithidea rhizophorarum* are abundant from the mid to upper intertidal zone.

A series of studies aimed to examine distribution pattern of the two endangered species with special reference to their habitat preference in an artificial tidal flat and some nearby natural tidal flats. We investigated their density at 6 study sites (2 sites each in an artificial tidal flat and two natural tidal flats) and conducted a sediment manipulation experiment in an artificial tidal flat. Analysis of the difference in habitat preference between artificial and natural tidal flats and understanding of variation in habitat preference between these two species with different life history characteristics could contribute to the successful creation of tidal flats with higher biodiversity including some endangered species and/or rich ecological functions.

Contrasting distribution patterns of *U*. *arcuata* and *C*. *rhizophorarum* were demonstrated in our observations and experiments for four years. *U*. *arcuata* strongly preferred fine muddy habitats in the sediment manipulation experiment. On the other hand, *C*. *rhizophorarum* preferred coarse mountain soils, although its preference seems not to be strong as the crab. These species specific preferences may be caused by some ecological properties such as burrow requirement in crab, feeding efficiency or constrains in relation to particle size of sediments. In our field experiment, *U*. *arcuata* quickly colonized new habitats of dredged fine sediments and its density reached the ceiling after only 5 months from the start of the experiment. The density, however, has not achieved the same level to the natural situation yet. In contrast, *C*. *rhizophorarum* continually increased in the experimental mountain coarse soils habitat and became similar with natural situations during three years. These species specific patterns of response to a newly created habitat suggested that we should carefully pay attention not only to the density of a single target species but also to their life history characteristics, age structure and habitat preference of multiple species, when we judge ecological conditions of artificial tidal flats.

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