Satomi Iino, Masanori Kohda, Satoshi Takahashi
Graduate School of Humanities and Sciences, Nara Women's University, Nara, Japan
e-mail: sato0504@ics.nara-wu.ac.jp
Masanori Kohda
Graduate School of Sciences, Osaka City University, Osaka, Japan
e-mail: maskohda@sci.osaka-cu.ac.jp
Satoshi Takahashi
Graduate School of Humanities and Sciences, Nara Women's University, Nara, Japan
e-mail: takahasi@lisboa.ics.nara-wu.ac.jp

Model of coexistence of fish by mating territory

The feeding territories of three species (*P. polyodon, P. trewavasae, P. famula*) of genus *Petrochromis* in Lake Tanganyika in Africa are distributed in a mosaic pattern. The feeding territories rarely overlap with each other. Both conspecific and congeneric individuals invading in the feeding territory are driven out as they competes food resource. Males of *P. polyodon, P. trewavasae, P. famula* have feeding territory that is 1 m apart from those of conspecific males. Their distances are caused by mating territory where conspecific males are driven out.

To examine if the mating territory promote the species coexistence we construted total length dependent rank model. In the model, the territory arranged in continuous space and feeding territory radius is decided from its species and total length. If territory overlap, smaller individual shift its territory for once, so that its territory does not overlap. Dependence of the number of individuals of each species and the number of species mating territory to the radius of the male of *P. polyodon, P. trewavasae, P. famula* are examined. Moreover, one fictitious species is added, to examined whether coexistence species number is limited. For the total length dependent rank model, the mating territory does not promote the coexistence of species.

We constructed another model where the time concept is introduced. It deals with growth, the death, and breeding. When two territories overlap, the overlapped region is divided by the line of equal influemce. We caluculate the influence by the difference between the feeding territory radius and the distance from the center. For this model, the mating territory of intermediate radius promotes the coexistence of species.