

Stable isotope analysis provides new insight into feeding habit of freshwater fish in a reservoir

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Mekong giant catfish (*Pangasianodon gigas*) is an endemic species to the Mekong basin, being one of the largest freshwater fish in the world. Recently, the species is facing decrease in the population size because of overharvesting and destruction of around their habitat. As a result, the species is listed in the CITES Appendix I and the IUCN Red List as a Critically Endangered Species. In spite of the importance of its conservation, the basic ecological knowledge of their habitats, spawning, diets, is poorly understood. A muddy environment where fish live makes difficult fish diet investigations with an observation by sight or video camera system. Moreover, a fishing method using gill nets results in difficulty obtaining a fresh sample and identifying prey items in their digested stomach-gut contents. To tackle these challenges, our project focuses on carbon and nitrogen stable isotopes measurements have been employed for acquiring their diet information. The purpose of this study is to estimate feeding habit of Mekong giant catfish. This samplings and observations were conducted in the Kaeng Krachan reservoir in the west Thailand from December 2017 to December 2019. The fingerlings of Mekong giant catfish have been released into Kaeng Krachan reservoir by Department of Fisheries, Thailand for more than 20 years. We collected the Mekong giant catfish samples and the different types of sources, such as fish, arthropod and algae, belonging to their food web. The carbon and nitrogen isotope ratios in the samples were measured with EA-IRMS at the Thailand Institute of Nuclear Technology and the Center for Ecological Research, Kyoto University. We calculated a trophic level of the Mekong giant catfish using nitrogen isotopes and then estimate the contributor of potential food sources to the fish using the Bayesian mixing model. Adult Mekong giant catfish without jaw teeth have not been considered as a carnivore for a long time since they were hard to prey an animal source with a quick motion. In our results, however, the fish have higher $\delta^{15}\text{N}$, being comparable to the $\delta^{15}\text{N}$ values in the carnivore fish. We obtained some sediments having higher nitrogen isotopes in addition to animal material such as fish and shrimp. The $\delta^{15}\text{N}$ values of decomposed matters such as carrion and corpse increased due to isotope fractionation during decompose process. Thus, our finding of higher $\delta^{15}\text{N}$ values in the fish suggested that they ate decomposed materials in sediments. Considering their morphological features, we expect that Mekong giant catfish, which is around 2 m in body length, might feed on sediment in the reservoir. Our results should be useful for understanding of basic knowledge about their ecology in a reservoir.

Keywords: Mekong giant catfish, carbon and nitrogen isotope, food web, feeding habit, reservoir