

### **Aggressive behavior and TTX in puffer fish**

Yoshitaka Sakakura<sup>1</sup>, Tomohiro Takatani<sup>1</sup>, Junnichi Nakayasu<sup>2</sup>, Kougen Okita<sup>2</sup>, Hideki Yamasaki<sup>3</sup>, and Kazutaka Sakiyama<sup>3</sup>

<sup>1</sup>Faculty of Fisheries, Nagasaki University, Japan, <sup>2</sup>Graduate School of Science and Technology, Nagasaki University, Japan, <sup>3</sup> National Research Institute of Fisheries and Environment of Inland Sea, Japan.

Understanding the function and development of fish behavior is important not only for biology but also for practical field. Since aggressive behavior and/or cannibalism cause high mortality in the artificial production of fishes, ecological meanings and triggering mechanism of aggressive behavior should be revealed.

We have been working on the stock enhancement program of tiger puffer *Takifugu rubripes* aiming successful release with smaller juveniles (<5 cm) in order to streamline the costly artificial rearing. Artificially raised puffer juveniles were revealed to be bold to a novel environment and predators leading to the high mortality with predation, which we judge as low fish quality for release. In order to improve the fish quality, we focused on tetrodotoxin (TTX) which is accumulated in the wild puffer via food web but is absent in the artificially raised fish. Administration of TTX to the juvenile puffer significantly decreased boldness and agonistic interactions, and raised the survival after release to the environment with predators. We further found that TTX was accumulated in the brain and nerves. Now we hypothesized that TTX is a kind of neuro-transmitter and are comparing the function and ecological meanings of aggressive behavior with other species.