

AS/PP/07

## Impact of Water Hardness on The Reproductive Performances of *Pseudetroplus Maculatus* (Orange Chromide) (Bleeker, 1862)

Jayasiri DGNTL <sup>1</sup>, Sundarabarathy TV <sup>1</sup>, Mudalige AR <sup>2</sup>

<sup>1</sup>Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale

<sup>2</sup>National Aquaculture Development Authority (NAQDA), Aquaculture Development Center, Dambulla, Sri Lanka

**Background:** *Pseudetroplus maculatus* is an euryhaline fish valued as an ornamental fish worldwide, for its bright coloration, small size and active swimming behaviour. However, its lower survival rate under captive conditions has limited its use in Sri Lanka's aquarium trade.

**Objective:** This study was conducted to address the low survival rates by investigating the effect of water hardness on the reproduction of *P. maculatus*, because no one has studied it yet.

**Methods:** The brooders were collected from Kala Oya estuary, located in North-Western province of Sri Lanka (8.2947° N, 79.8397° E). The study used four water hardness levels 35.00 (Kandy), 71.20 (Dambulla – Control), 90.00 (Matarata) and 178.00 (Jaffna) ppm as CaCO<sub>3</sub> representing different regions of Sri Lanka, each tested in triplicates under optimal level of temperature 24–26°C. Male and female fish with mean weight 5–7g were separately acclimated to the experimental water hardness for two weeks. They were fed with a commercial diet with crude protein (42.0%), fat (10.0%) and minerals twice daily at a rate of 5% of body weight. Breeding experiments were conducted using twelve glass tanks (60 x 30 x 18 cm<sup>3</sup>), each with a substrate of small rocks and sand to mimic the natural environment. Individual pairs were introduced into each breeding tank in the evening, and breeding trials were carried out in two separate phases; T1 and T2. Completely Randomized Design (CRD) was used as the experimental design while one – way analysis of variance (ANOVA) was used to compare the effect of water hardness.

**Results:** No significant difference in breeding success ( $P > 0.05$ ) was observed across the different water hardness conditions in both breeding trials. Pre- and post-spawning behaviours remained consistent under all experimental conditions. Although water hardness did not influence fertilization rates or egg hatchability, comparatively higher mean spawning potential was recorded at 90 ppm (T1 =  $139.3 \pm 29.0$ , T2 =  $138.5 \pm 31.8$ ) and 178 ppm (T1 =  $84.0 \pm 74.7$ , T2 =  $177.5 \pm 95.4$ ) hardness levels. The findings suggest that higher water hardness levels (90 -200 ppm) are generally more conducive to successful reproduction of *Pseudetroplus maculatus*.

**Conclusion:** Since it was confirmed in their breeding performance studies that they keep and protect their hatchlings in sand pits, environmental enrichment such as the use of fine sand or smooth gravel substrate was found to be essential for promoting natural spawning behaviour.

**Keywords:** Water hardness, Breeding behaviour, Fertility rate, Hatchability, Spawning, Survival