Effect of Selective Breeding on Growth, Survival Rate and Tolerances to Environmental Changes in Tiger Grouper *Epinephelus fuscoguttatus* (Forsskal, 1775)

Paiboon Bunlipatanon and Wanpen Khammee
Krabi Coastal Fisheries Research and Development Center

Abstract

Growth and survival rates including tolerances to rapid change of salinity and low oxygen among 12 families of tiger grouper were compared. Artificial insemination was used to breed offspring from 2 females and 6 males. Larvae from 12 families were reared until 15 days-old before subjecting to two periods of experiments. The first period was rearing of larvae from 15-40 days-old while the second period from 41-80 days-old before investigating various characteristics concerned.

There were genetic variation among 12 families by polymorphic bands in between 25-56% with 100-255 base pair of DNA band sizes. The 1st and 6th male brooders had similar DNA pattern which may genetically related due to same allele found at same position in several pairs of primers.

The first period experiment, after rearing larvae of 15-40 days-old from 12 families found that offspring from different parental pairs were significantly different (p<0.05) in growth and survival rates. Tolerance in rapid change of salinity in offspring derived from the 2nd female brooder (34.27±4.70% average survival rate) was significantly better than those from the 1st female brooder (22.22±4.69% average survival rate) (p<0.05), whereas larvae from the 3rd male brooder gained the highest average survival rate of 41.60±0.93% which was significantly higher as compared with those derived from others (p<0.05). Larvae from different female brooders had no significant difference (p>0.05) in low dissolved oxygen tolerance, but larvae from the 3rd male brooder were most tolerance to dissolved low oxygen with average survival rate of 45.00±6.84% which was significantly different (p<0.05) from those from other male brooders.

The second period experiment, rearing of 41-80 days-old fish found that juveniles derived from the 2nd female brooder gained average final weight of 14.38±2.58 gram which was significantly greater than those from the 1st female brooder (average final weight 10.49±1.48 gram) (p<0.05). Juveniles derived from the 2nd, 3rd, 5th and 6th male brooders
yielded average final weight of 13.14±4.53, 13.67±2.63, 13.46±1.43 and 12.82±2.85 gram which had no significant difference (p>0.05) but significantly different from those derived from the 1st and 4th male brooders with average final weight of 12.04±2.19 and 9.49±0.72 gram, respectively (p<0.05). Average survival rate of juvenile fish derived from the 2nd female brooder (77.93±1.52%) was significantly higher than those from the 1st female brooder (74.18±1.09%) (p<0.05) Juvenile fish derived from the 4th, 5th, and 6th male brooders gained average survival rates of 95.05±1.34, 93.85±2.78 and 91.19±1.65%, which were significantly higher than those from the 1st, 2nd and 3rd male brooders with average survival rates of 26.25±5.07, 60.00±2.79 and 90.00±5.68%, respectively (p<0.05). On the other hand, the fish derived from the 2nd female brooder had average food conversion rate of 2.76±0.11 which was significantly lower as compared with those from the 1st female brooder (3.19±0.57) (p<0.05). Average food conversion rate of juveniles derived from the 3rd male brooder was lowest (1.81±0.14) and significantly different from those from food conversion rate than the other male brooders (p<0.05).

**Key words:** tiger grouper, selective breeding, growth rate, survival rate, tolerances to environmental changes

*Corresponding author: 141 Moo 6 Sai Thai, Muang, Krabi, Thailand. 81000 Tel. 0-7566-2060
e-mail: paiboonbun@hotmail.com*