Captive Broodstock Maintenance and Photothermal Induction of Gonadal Maturation in Gag, *Mycteroperca microlepis* and Jewfish, *Epinephelus itajara* for Controlled Production of Fry

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ABSTRACT

A captive brookstock of jewfish, *Epinephelus itajara*, with four individuals ranging in weight from approximately 27.0 kg to 61.4 kg, was maintained and monitored for 419 days in 3.65 m diameter circular fiberglass tanks with cartridge and fluidized bed biological filtration systems. Loading density was 10.15 kg/m^3. Dissolved oxygen (D.O.) ranged from 4.8 to 9.3 mg/l, with a mean of 6.6 (±0.75 s.d.) mg/l. Salinity was maintained around 30 ppt. Mean nitrite (NO_2) level was 30.67 µg/l (±35.12 s.d.); range was 3.89 – 231.93 µg/l. Mean NH_4 level was 70.80 µg/l (±97.06 s.d.); range was 2.45 – 620.85 µg/l. Photoperiod and temperature were maintained at 9l:1 SD and 24.7°C (±1.91 s.d.), respectively, for most of the maintenance period. Mean daily food consumption was 287.14 g for the group for the principal food ration (cigar minnow). Mean daily feeding rate for the principal food ration was 0.2% body weight.

Disease incidence was minimal except for outbreaks of monogenetic trematodes. At least two species occurred in the surface-water mucus which was monitored weekly. Dylox (Dimethyl 1-2,2,2-Trichlos-Androrethyl I Phosphanate), diluted in tank water to 1.0 mg/l, was effective treatment for both larval and adult parasite stages. Oncomiracidia experienced loss of ciliary movement after 21 hours exposure to Dylox concentrations above 0.2 mg/l(0.2 – 1.6 mg/l). Dylox was removed from culture system water by water changes and filtration with activated carbon. An abbreviated photothermal regime was designed to induce gonadal maturation.

Eight gag, *Mycteroperca microlepis*, (3.1 kg mean weight; 537.5 mm mean sl) were maintained in similar systems, exposed to a short, cool, constant photothermal regime (10L:14D; 21-23°C) and fed daily doses of 17a methyltestosterone to induce gametogenesis and sex inversion, respectively. After 150 days one presumptive female demonstrated all stages of spermatogenesis. Within 4 weeks all presumptive females in the treatment group demonstrated ongoing spermiation. With continued androgen and photothermal treatment, secondary males and primary females were maintained in a state of

functional maturity. Some spontaneous egg releases were induced in gag with photothermal manipulations, but eggs were not fertilized. Fry production was obtained by inducing final maturation and ovulation of females with intramuscular injection of human chorionic gonadotropin (HCG) at a dosage of 0.600 IU per gram body weight, followed by a second injection of 0.275 IU per gram body weight 24 hours later. Ovulated eggs were successfully strip spawned and fertilized with milt collected from sex reversed secondary males. Resultant fry survived to yolk absorption.

Jewfish and gag broodstocks successfully withstood the rigors of captivity and preliminary mariculture evaluation. The use of photoperiod and temperature as entrainers of reproductive rhythms is effective for gag. Performance of jewfish and gag broodstocks in captivity appears promising.