

M.Phil. in Zoology

Population Dynamics of *Gerres oblongus* (Pisces-perciformes) from the Jaffna lagoon

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Abstract

The present investigation was carried out for two years from July 2007 to June 2009 to understand the population dynamics covering aspects such as length weight relationship, length at first maturity, total annual fecundity, spawning frequency, peak season of breeding, type of spawning, growth parameters, mortality parameters and exploitation rate of *Gerres oblongus* from the Jaffna lagoon, Sri Lanka. The 'b' values 2.9776, 3.0112 and 2.9697 obtained from the length – weight relationship for male, female and indeterminate respectively, not significantly different from 3 indicate that the fish follows the cube law. According to histological analysis of gonads female were categorized into seven oocyte developmental stages such as chromatin nuclear stage, perinucleolar stage, cortical alveoli stage, yolk stage, nuclear migration stage, hydration stage and postovulatory follicle stage based on the occurrence of the most advanced type of oocytes present, regardless of their abundance whereas males into four stages such as immature, maturing, fully mature and spawning. Highest percentage of stage VII ovaries or post ovulatory follicles emphasized the cessation of spawning during this period thereby suggesting peak period of spawning for *G. oblongus* during October – February. Spent females constituted 16-19 % during November to February and 1-4 % during February and May. Highest percentage of post ovulatory follicles emphasized the cessation of spawning during this period thereby suggesting peak period of spawning for *G. oblongus* during October – February. Presence of more than three stages of eggs in fully ripe ovaries characterized that *G. oblongus* spawn in more than three batches and said to be asynchronous. Fecundity varied from 284,152 to 2,642,154. Size at maturity curves indicated male reached maturity at 14.26 cm total length while female reached maturity at 13.38 cm total length. The optimized values for K and L_{∞} obtained by the ELEFAN I was 1.0 year⁻¹ and 29.4 cm. The estimated t_0 value was -0.159. The length-converted catch curve gave a Z value of 3.92 year⁻¹. The natural mortality coefficient (M) obtained through Pauly's empirical model was 1.86 year⁻¹. The computed instantaneous fishing mortality coefficient (F) is 2.07. The predicted exploitation rate is 0.413. The computed exploitation rate of 0.53 is above the predicated E_{max} express that the stock is highly overexploited. Thus, the fishing pressure on the stock has to be reduced. More capture should be prohibited by a reasonable decrease in the effort or by modifying the mesh size of the net for *G. oblongus* species. According to the isopleth diagram, the optimum value of L_c/L_{∞} to obtain optimum exploitation rate was 0.7. Therefore the optimum L_c could be 20.58 for an optimally exploited *G. oblongus* fishery.