

## ABSTRACT

Studies on the Biology of *Corydoras aeneus* (Gill, 1858) (Callichthyidae)

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Monthly sampling of *Corydoras aeneus* in Trinidad, West Indies indicates that spawning occurred mainly from June to July in the Valencia drainage and was more seasonal and synchronised than in the Arima drainage. At Arima there was prolonged spawning from December to January and June to November possibly as a result of more stable water quality parameters, the presence of a flow of water and greater levels of production throughout the year.

The minimum length and age at maturity were 43.5mm standard length (SL) and between 3 and 5 years respectively for females at Valencia. A high correlation between fecundity and gonado-somatic ratio (GSR), ( $r = 0.88$ ) indicated that GSR is a better indicator of fecundity than standard length or body weight. *C. aeneus* is a multiple batch spawner with asynchronous oocyte development and maximum batch fecundity of 465 and 1,258 mature oocytes at Valencia and Arima respectively.

There were no clear correlations between the variation in water conductivity,

hardness, pH and phosphate levels with gonad maturation and spawning although high average GSRs were preceded by periods of high water conductivity and high average somatic condition coincided with periods of high phosphate levels. Laboratory experiments showed that an abrupt decrease in conductivity did not induce spawning activity.

Fishes that received a high protein prepared food showed a significant increase in GSR when compared to those that received live or prepared low protein food. The presence of a specific substrate type is not necessary for the promotion of spawning.

Carp pituitary extract when used at the lower dosages of 3 and 4 mg/kg had a significant effect on the increase in GSR, while in one trial the higher dosage of 5mg/kg stimulated spawning. To minimise costs and increase the chance of successful induction of spawning, pituitary from *Hoplosternum littorale*, which is easily bred in captivity and has a close phylogenetic relationship with *C. aeneus*, should be used in further studies.

Growth increments were viewed on opercular bones, pectoral spines and otoliths. Opercular bone and pectoral spine radii as well as otolith length varied linearly with SL. Marginal increment analysis revealed that three opaque growth bands were formed on the opercular bone during the one year

sample period and the associated maximum lifespan estimated was 5 years. The macrostructural analyses of opercular bones and otoliths are the recommended methods for ageing of the species.

Individual growth of *C. aeneus* in an outdoor concrete pond was discontinuous and unpredictable. Growth rates were size dependent and sigmoidal with smaller individuals generally growing at a faster rate than larger ones. The fastest growth rate was observed for fishes in the 31-35mm SL class (2.44mm/month) and the slowest for those in the 51-55mm SL class (0.09mm/month). The maximum length ' $L_{\infty}$ ' derived from a Walford plot for the length classes combined was 51mm SL and the corresponding growth coefficient 'k' was 1.56 per year.

Comparisons of nine morphometric characteristics of fish from both study sites revealed a significant difference in the relationship between standard length and body width only. The mean length of fish caught at Arima was also greater than those from Valencia. These differences are possibly due to differences in production levels and population characteristics (sex ratios, age distribution, growth rate and genetic composition) at the two sites. Biochemical studies should be conducted to determine the level of genetic similarity of fish from both sites.

Stock assessment and management of the species are recommended based on evidence of growth and recruitment overfishing at both sites.