

The Cayman Islands Nassau Grouper Study - A Progress Report

PHILLIPPE G. BUSH and GINA EBANKS-PETRIE

Natural Resources Unit

P.O. Box 486 G.T.

Grand Cayman, Cayman Islands, B.W.I.

The Cayman Islands Natural Resources Unit's Nassau grouper study was initiated in 1987 in response to increasing verbal reports from local fishermen of declines in both numbers and size of grouper being caught during the yearly spawning aggregation of this species. The spawning aggregations occur at or around the full moon during January (and sometimes February) at three main areas (although two more minor areas are known) which are located off the eastern ends of the three islands. The objective of the study is to collect annual data on the structure of the spawning populations in order to formulate a management plan for the local Nassau grouper fishery. In-situ observations are made using SCUBA and underwater video equipment. Catch data collected includes size, numbers, and sex of fish caught. Sagittal otoliths are removed and retained for aging purposes. Aging of fish is carried out by the microscopic examination of growth rings observed in thin sections of the otoliths. Validation of this technique (*i.e.*, proving that the rings observed in otoliths represent yearly increments of growth) is currently underway using a number of captive fish injected with oxytetracycline (OTC). The OTC is incorporated in the otolith and forms a fluorescent band (when the thin sections are viewed under ultra-violet light) whose position will indicate whether or not the rings are laid down annually.

Size/age frequency distributions generated from the data are being used to determine the structure of the spawning population. Growth curves based on length and micro-photographic aging data show rapid growth for the first eight years after which the rate of growth slows down. All growth curves for annual data collected to date approximate to the von Bertalamffy growth model. As the fish sampled are assumed to be pre-spawners (because they are taken from spawning aggregations), it is very probable that the real age of any fish is almost a year older than the reading derived from the micro-photographs. Most otoliths showed a "plus" growth when examined. Assuming that aging is accurate, estimates of age at first spawning are between 4+ and 8+ with most fish spawning at age 7+ years. There are no obvious spawning checks in the thin otolith sections from older fish, although variations in growth ring width may be caused by spawning or sex change.

To date, the data do not reveal any strong or weak year classes nor do they show any evidence of protogyny (size and age frequency distributions show no statistical differences between the sexes). The oldest fish sampled to date is 27 years and the youngest is 3 years. In all years sampled there are frequent values for ages of 10 years and over. These ages are considerably older than those reported in the existing literature on *Epinephelus striatus* and will therefore have important implications for any management strategy employed for the fishery.

Continuing effort is being made to enhance the data base and it is envisaged that the validation of the aging technique will be completed within the next year. With these additional data, it should be possible to predict mortality rates. In order to recommend a final and proper management strategy for the fishery, it will be necessary to ascertain if the spawning populations are made up of homing individuals to specific aggregations and if the populations of each island are genetically distinct. It is therefore proposed to examine mitochondrial DNA patterns. An interim report with preliminary recommendations will be tabled in the next two years based on the examination of the cumulative data.