

國立台灣海洋大學九十二學年度碩士班甄試入學考試試題

系所名稱：海資所碩士班

*答案以橫式由左至右書寫於答案卷上！

科目名稱：英文科學論文閱讀

一、

The big eye, *Priacanthus macracanthus* Cuvier, one of the most common and important demersal species for Taiwanese trawl fishery, was caught abundantly in the waters around Taiwan. Based on monthly catch data (1977-1997) from Tahsi fish market, northeastern Taiwan, annual yield of the big eye was 248 Mt and ranked the first among all species caught.

Age determination for a fish stock is essential for assessing population situation with stock assessment models, such as virtual population analysis, and dynamic pool model. Some studies on taxonomy and distribution for the big eye have been published. However, very little is known on age and growth of this species despite of Liu et al. and Joung and Chen's work based on the data set of early 1980s. Moreover, parameters of the von Bertalanffy growth equation (VBGE) estimated by Joung and Chen⁷⁾ were significantly different from those by Liu et al.. Thus, to get reliable estimates on age and growth of the big eye is a necessity.

Ageing fish with length-frequency data went back to the late 1800s. Since then, many methods have been developed. Some of them have been made to computer packages, such as ELEFAN and MULTIFAN. MULTIFAN, a length-frequency analysis software, has been successfully applied to estimate growth parameters of many fish species i.e., Pacific pomfret, *Brama japonica*, southern bluefin tuna, *Thunnus maccoyii*; swordfish, *Xiphias gladius*, skipjack tuna, *Katsuwonus pelamis* and bluefin tuna, *Thunnus thynnus*.

This study is to estimate parameters of the VBGE on the big eye in the two periods, 1981-1982 and 1997, with MULTIFAN. Age composition and growth parameters in these two periods were compared.

- (1) Please translate this text into Chinese. (25%)
- (2) Why the author wants to do this study? (13%)
- (3) What is the objective of this study? (12%)

以下所選之短文乃摘錄自「魚類族群動態」學門-科學論文之一小段文章，請將該文譯成中文

註：刮號內之文：人名及年代不用翻譯

Georges Bank 為地名，直接使用英文不用翻譯

Atlantic cod *Gadus morhua*：請譯成「大西洋鱈魚」

year-class：為同一年出生之魚，請譯成「年級群」

Otolith：(魚類之)耳石，可作為年齡鑑定之用；請譯成「耳石」

Interannual fluctuations in the year-class strength of marine fish populations are often evident by the end of the first year of life, suggesting that the key determinants of interannual survival variability occur during the early life history (Houde 1987). Covariation in the growth and survival rates of the young is often assumed to be a source of the variability in year-class strength, but direct evidence of the effect is lacking. According to the hypothesis linking growth and mortality rates in young fish (Shepherd & Cushing 1981, Houde 1987, 1989, Miller et al. 1988, Rice et al. 1993, Cushing & Horwood 1994), a survival advantage goes to fish growing quickly through a 'mortality window', a period of several months during which as much as 99.99% of a cohort may die. A rapid growth rate through the larval and juvenile stages is thought to increase the probability of survival due to an enhanced ability to feed and avoid predators (Rice et al. 1993, Cushing & Horwood 1994). While widely accepted, field evidence supporting this hypothesis for marine fishes has been elusive. Cod spawn on Georges Bank (NW Atlantic) in late winter of each year, producing buoyant eggs and larvae which metamorphose into pelagic juveniles of about 17 mm length after 1 to 3 mo (Campana & Hurley 1989). The pelagic juveniles feed in the water column until they reach a size of 30 to 40 mm, at which point they begin a protracted settlement to the ocean bottom (Lough & Potter 1993). Using the otolith microstructure of juvenile Atlantic cod *Gadus morhua* from Georges Bank, I reconstructed the daily growth histories of the 1984-1988 year-classes and related them to 2 independent indices of survival through to the adult stage. Differences in growth trajectories among year-classes were subsequently used to calculate expected differences in exposure time to high larval mortality rates, and the associated impact on cohort abundance. These cohort abundance predictions were then compared with the differences in year-class strength which were actually observed. The objective of the study was to test the hypothesis that growth and survival rates in young marine fish are directly related.