

POPULATION DYNAMICS OF THE MAIN PELAGIC SPECIES EXPLOITED IN THE JAVA SEA: STOCK EVALUATION

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ABSTRACT

This study was based on length composition data collected from purse seine fleets operating in the Java Sea, and aimed to elaborate the state of the stock of the main species. Two approaches, i.e. cohort analysis and dynamic pool model were employed in order to simulate the effect of fishing mortality being generated by mini purse seine fishery on the yield, as well as to describe the population structure by size. The impact of exploitation of the young fishes by small scale fishery on the the total yield was considerably not important. However, the accuracy of the analysis seemed to be hampered by pseudo estimates of mortality parameters, due to the condition that the structure of data input were strongly influenced by migration phenomenon and fishing strategy.

KEYWORDS: small pelagic, yield per recruits, cohort, stock, mortality, Java Sea

INTRODUCTION

In term of population dynamics, i.e. changes with time, there are several factors governing variation of the population size, namely number of recruits, mortality, and somatic growth of individuals. However, the process of population changes is more complicated. We believe that these changes in the system in the nature of the Java Sea can not be simply described as compartement diagram or equation showing equilibrium of influx, growth, removal, and natural death. In the context of fisheries problems, separate analysis of the part of the dynamic system would be still valuable in explaining possible influence of the ecological dimension on the characteristics of population structure.

Fish stocks are commonly estimated by performing one or more methods of the following three categories of approaches. The first one is direct method, that usually apply acoustics by converting roughly the biomass from acoustic deviation data. The second approach is the global or surplus production model. All of the family of this model at least need catch and effort data with steady state equilibrium assumption underlying the model. The last approach is age based model. It is due to Beverton & Holt (1957) who modelled the populations change with time varies in deterministic or mathematical equations. Another age based method is virtual population analysis that is a procedure for determining number of individuals fish based on catch at age data.

Since the origin version of the last approach requires that the catch is classified into ages, Jones (1974; 1981); Pope (1984) pointed out that

length composition data can be used in the same fashion. In this case, the growth parameter estimates are absolutely required for converting length into age. With assuming Von Bertalanffy growth model, we perform the yield per recruit model of Beverton & Holt (1957) and Jones' length cohort analysis (Jones, 1981) for 2 species of *Decapterus*, *Amblygaster sirm*, and *Sardinella gibbosa*. In this study, length based models are applied with particular caution due to incomplete data required for modelization and mortality estimation.

In fact, the accuracy of this approaches may be hampered by insufficient information from other fisheries exploiting the Java Sea stock, while our main data were collected from the big and medium purse seine fishery landing in the main fishery harbor in the north coast of Java. This constraint relates to the migratory behavior of the pelagic fishes, as well as unreliability of the statistical data in the regions outside Central Java province.

The pelagic fisheries in the Java Sea consist of different type of fishing gear having different selectivity by species and size. However, the large and medium purse seine contribute more than 60% of *Decapterus* spp and *A. sirm*, and around 30% of *S. gibbosa* to the total landing of the same taxonomic group in the Java Sea area (included south of Kalimantan). For this reason, we assume that the catch data are coming from the same population and no other fishery (except of the Javanese fishery) exploit the same stock. But precaution should be taken for possible bias generated by inaccurate official statistical data.

Many fishing gears are used to catch the same species beyond the fishing areas of the Javanese

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