

## POPULATION DYNAMICS OF THE MAIN PELAGIC SPECIES EXPLOITED IN THE JAVA SEA: BIOLOGICAL PARAMETERS ESTIMATES

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### ABSTRACT

Several sets of length frequency data (1991 to 1995) of the six species were used to estimate the growth parameters and to discuss the results in relation to possible influence of data structure on the parameter estimates. The von Bertalanffy growth parameters were well estimated using the Elefan routine and Ford-Walford method. The existing oscillation pattern and the pseudo growth progression curve were identified. It can be noticed that the estimated values do not represent the whole stocks. The emmigration of adult fishes is considered as the more important factor determining the shape of oscillation curve rather than that of the nature somatic growth pattern. More cohorts identified staying in the Java Sea during anomaly year consequently result a higher estimate values of K of certain species. The fish stock available for the fisheries mainly consists of young fishes, i.e. the average sizes of the main species are smaller than approximate length at first mature and very few specimens of adult fish were not available in the fishing ground all of the year. Two groups of recruits were identified, the major and the minor ones entered the fisheries during the Southeast and northwest monsoon, respectively. The major recruits were not the offsprings descended by the adult fishes stayed in this area in last year period.

**KEYWORDS:** small pelagic, length frequency, growth, maturity, recruitment, Java Sea

### INTRODUCTION

Biological study can be considered as the first stanza in understanding the population dynamics of the species. In the context of fisheries problems, these components of the dynamic system may not be analyzed separately. Nevertheless, separate analysis of the part of the system would be still valuable in explaining possible influence of the ecological dimension on the biological parameter. The parameter estimates of these component, i.e. growth, recruitment pattern and reproduction, will be evaluated in order to find possible relation to ecological aspects and interaction with biological dimensions.

Due to the need of growth parameter estimates as input parameters for length based stock assessment models, several studies on the estimation on growth of pelagic species in the Java Sea have been conducted since the beginning of 1970's. Sujastani (1974) estimated the growth parameters of *Rastrelliger kanagurta* and *R. brachysoma* in Karimata Strait and Nurhakim (1993; 1995) in the whole Java Sea for *R. kanagurta*. Dwiponggo *et al.* (1986) reanalysed the old data including five pelagic species, with no inspection on the validity of the data. We may cite also Suwarso *et al.* (1995); Sadhotomo & Atmaja (1985) for four among the main species, and Widodo (1988b) for 2 species of *Decapterus*. Most of those studies were based on one year period of observations and there was no evaluation on the

pattern of estimates to be done. In this study, several set of length frequency data (1991 to 1995) of the main six species caught by purse seine fishery were used in attempting to estimate the growth parameters as input data for the model of stock evaluation.

### MATERIALS AND METHODS

#### Materials

This study was mainly based on the length frequency measurement carried out in the years 1991 to 1995 and reproduction data of 1992 to 1993. Length frequency samples were collected from the seiners landed in Pekalongan, Juana, and Tegal. Compilation of the length composition data used in this study were listed in the tables of the document published by the Pelfish Project (Sadhotomo & Potier, 1993; 1994; 1995; 1997). In order to obtain a proportional figure to the number of fishing boats operating in the fishing zones, the samples were systematically taken from the seiners berthing in harbors.

Six main species were chosen for representing the pelagic species in the Java Sea. These species contributed more than 85 percent of the total landing (Potier & Sadhotomo, 1995), i.e. *Decapterus russelli*, *D. macrosoma*, *Rastrelliger kanagurta*, *Amblygaster sim*, *Selar crumenophthalmus*, and *Sardinella gibbosa*.

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