



# Short Body Mackerel (*Rastrelliger Brachysoma*) in the Java Sea, Indonesia

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## Introduction

Between 1961 and 2016, the average annual increase in global food fish consumption (3.2 percent) outpaced population growth (1.6 percent). In per capita terms, food fish consumption grew from 9.0 kg in 1961 to 20.2 kg in 2015, at an average rate of about 1.5 percent per year [1]. Indonesia has a very large potential of fish biological resources. Biological resources according to the Law of the Republic of Indonesia No. 5 of 1994 include genetic resources, organisms or parts thereof, populations or biotic components of other ecosystems with benefits or value that are tangible or potential for humanity.

*Rastrelliger brachysoma* (short body mackerel) is a small pelagic fish resources variety of mackerel that is the most commercially important [2]. This species is listed as data deficient. Given the absence of an international management body, further monitoring of this species is needed on the national level, in addition to species-specific data on landings, effort and population status [3]. These species landings are primarily reported in combination with mixed *Rastrelliger* spp. [4], this fish group is a basic need for livestock and fishery products based on Regulation of The Presidential of The Republic of Indonesia Number 71. The preference rate for mackerel in Java in 2008 was 7.87% for fresh mackerel and 5.1% for salted fish (processed mackerel) [5]. The highest expenditure for fresh mackerel is DKI Jakarta Province, Banten Province and West Java Province [2]. Mackerel chosen for its distinctive taste, high nutritional content (especially omega 3), affordable or cheap prices and easily obtained in every traditional market [2,6]. One of the basic information that needs to be known in managing fish resources is information about the bioecology of the fish. The objective of the paper is to review the bioecology of the fish in the Java Sea, Indonesia.

## Rastrelliger Renus

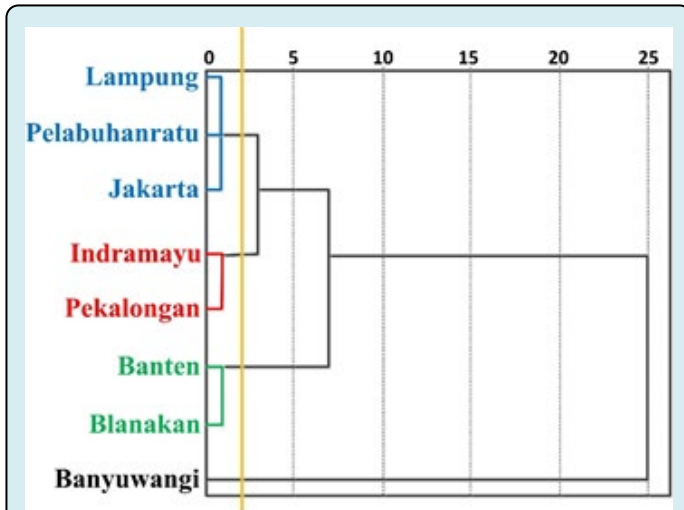
*Rastrelliger* genus consists of only three species, namely *R. brachysoma*, *R. kanagurta*, and *R. faughni*. *R. brachysoma* and *R. kanagurta* are widely exploited; *R. faughni* is not of high commercial importance. They have similar characters and can be identified by:

1. Genetic identification based on mtDNA sequence analysis Muto, et al. [7-10] based on analysis restriction fragment length polymorphism [7,11] and based on random amplified polymorphic DNA (RAPD) [12,13].
2. Morphology identification [2,10,12-14].

## *Rastrelliger brachysoma* in the Java Sea, Indonesia

The *Rastrelliger* genus can be clearly identified using the molecular method. The dendrograms NJ phylogenetic tree collaborated by the minimum spanning network shows that *R. brachysoma* in the Java Sea is divided into two clusters that are cluster A and cluster B [4]. The ratio of cluster members in this study is Jakarta (A: 89.6%; B: 10.4%), Lampung (A: 75.5%; B: 24.5%), Pelabuhanratu (A: 80.0%; B: 20.0%), Banten (A: 89.1%; B: 10.9%) and Banyuwangi (A: 100%). Based on these results we then used analyzed RFLP, the results of virtualization RFLP mDNA using HincII and HindIII enzymes indicate that *R. brachysoma* in the Java Sea is also divided into two clusters [4]. Based on the two previous research results, then in March 2013 an RFLP analysis was carried out on 13 mackerel from Pelabuhanratu, and the result is cluster A 76.9% and B 23.1% [15]. Zamroni, et al. [11] reported that the result of analysis RFLP mDNA in *R. brachysoma* form north Jakarta, Indramayu, Pekalongan, Rembang and Pasuruan (Madura strait) showed no significant differences in fish samples genotype.

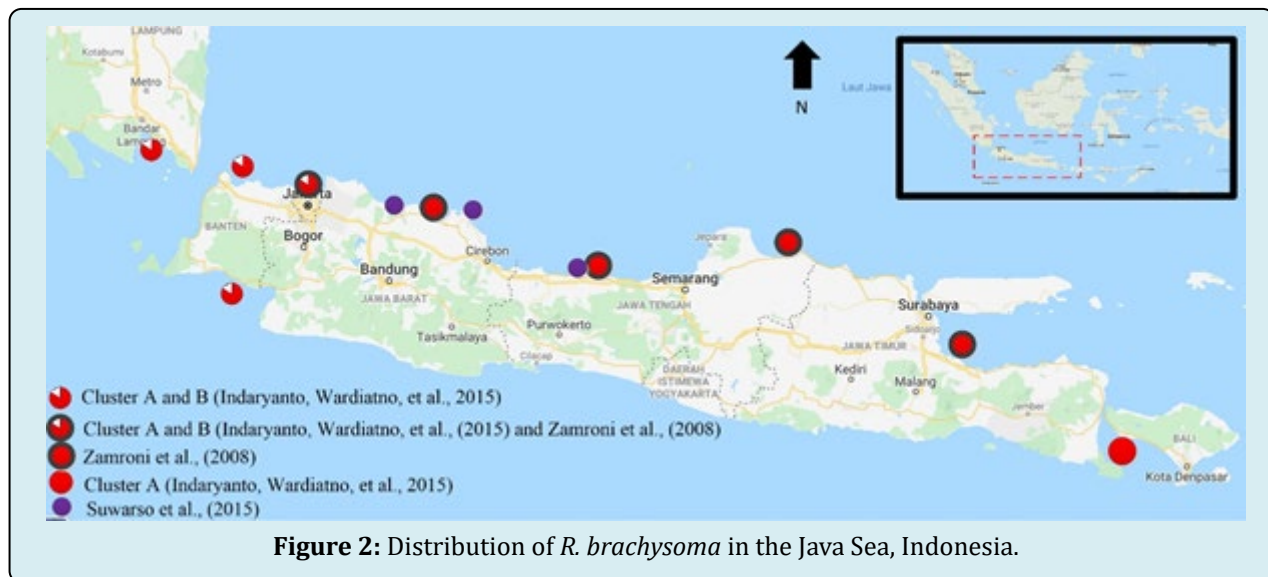
The phylogenetic relationships confirmed the morphological classification of *Rastrelliger* species, the body depth ratio of *R. brachysoma* ranged from 1:2.6 to 1:3.9 and was highest than 1:4.1 for *R. kanagurta* [5]. *R. brachysoma* is not much different among both the cluster based on the morphology and morphometric characters [15].



**Figure 1:** Dendrogram of *R. brachysoma* fork length/FL (cm) data from Indaryanto, et al. [15] and Suwarso, et al. [16] research.

Based on Indaryanto, et al. [5] and Suwarso, et al. [16] research, based on fork length / FL (cm) mackerel is divided into 4 groups, namely the western region fish (Lampung, Pelabuhanratu and Jakarta), the middle region fish group (Indramayu and Pekalongan), the Nursery Ground group (Banten and Blanakan), and fish groups in the eastern region (Banyuwangi). Indications of *R. brachysoma* spawning in the waters of Indramayu and Jakarta Bay occur around the west season (October to November); larger (more mature) gonads are found around the Jakarta Bay [17].

Differences in fish size between different regions and times are thought to be influenced by the environmental conditions of the waters especially the temperature and the availability and quality of different foods. Changes in environmental conditions (temperature, salinity, plankton abundance, etc.) in shallow coastal waters occur very quickly because they are strongly influenced by land. The north coast of Java is very vulnerable to fishing activities and environmental conditions (eg., pollution) so that it affects growth and reproduction [11]. *R. brachysoma* is a fishing target on the north coast of western Java while *Decapterus* spp. is on the central and eastern parts [17]. Genetically, *R. brachysoma* are low genetic diversity so that population conditions are very vulnerable [5,11]. Whether the ecosystem pressure that causes fish in the western region has two clusters, or cluster B is the population from the southern part of the South China Sea. More research is needed on this matter [18].



**Figure 2:** Distribution of *R. brachysoma* in the Java Sea, Indonesia.

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