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Spatial Distribution of *Rastrelliger kanagurta* (Cuvier 1817) in the South China Sea Exclusive Economic Zone (EEZ)

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Abstract. Rastrelliger kanagurta inhabits the South China Sea, where it is the most abundant commercial fish. Understanding distribution of this species is important. Objective of this study is to describe the relationship between spatial distribution of *R. kanagurta* and its local environmental factors. Chlorophyll-*a* distribution and sea surface temperature was obtained from Aqua MODIS satellite image. Fisheries data of 2007 to 2010 were obtained from the Southeast Asean Fisheries Department Center (SEAFDEC). These data were analyzed in relation to physical and environmental factors to establish the spatial-temporal distribution of the species. Catch per unit effort (CPUE) was calculated from the fisheries data and used as abundance index. Kernel Density maps of the abundance were created. The result showed that the abundance generated by Kernel Density analysis at 10.0 to 12.0 were associated with chlorophyll-*a* concentration of 0.4 ± 0.1 mg/m³ and sea surface temperature of 27.0 ± 1.0 °C at offshore of Pahang coast. The density maps showed that the increase of *R. kanagurta* abundance was occurred in October. The environmental factors in South China Sea played an important role on *R. kanagurta*'s density patterns. This study indicated the capability of GIS and satellite image to indicate aggregation area of *R. kanagurta*.

Keywords: Distribution, abundance; *Rastrelliger kanagurta*, chlorophyll-*a*, sea surface temperature, satellite image, Geographic Information System (GIS).

PACS: 92.20.Jt (Ocean Biology); 92.05.Ek (Ocean Longterm Variability); 92.10.Sx (Oceanography Coastal); 07.07.Df (Remote Sensing)

INTRODUCTION

The South China Sea off the east coast of Peninsular Malaysia supports a diverse fleet of finfish trawlers that operates throughout the years targeting predominantly *Rastrelliger kanagurta*. The majority of the finfish trawling effort is concentrated in the Exclusive Economic Zone (EEZ) at water depths up to 60 meters, but typically between 20-40 meters. The natural fish stock of the entire Malaysian seas is 1.87 million metric ton/year and from the total fish stock, coastal fisheries represent 1.07 million metric ton/year, while deep sea fisheries in the EEZ contributes 296 k metric ton/year [1]. Pelagic fish plays an important role in the economics of fisherman in Malaysia. *R. kanagurta* is one of the largest pelagic fish resources in Malaysia's fisheries. This fish is a neritic species (inhabiting the ocean waters between the low tide mark and depth of 200 meters) and occurs in areas where surface water temperatures are at least 17 °C.

Monsoon is the main factor governing the characteristics of South China Sea. This area is influenced by the southwest monsoon in summer and the northeast in winter. It is increasingly recognized that spatial trends in fish stock distribution and abundance may be related, at least in part, to environmental variation such as chlorophyll-a and sea surface temperature. These two parameters are commonly used in remote sensing for fisheries data analysis. Application of remote sensing in fisheries study has rapidly grown. Geographic information system (GIS) has also been extensively used in marine fisheries for studies of the relationship between fish population dynamics and environmental factors [2-5]. This study aims to determine the spatial distribution of *R. kanagurta* abundance in Malaysian waters and its relationship with local environmental factors.

METHODOLOGY

Study Location

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