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THE RELATIVE CONDITION FACTOR AND CARAPACE LENGTH-WEIGHT RELATIONSHIP OF 'UDANG WINDU' *PENAEUS MONODON* FABRICIUS IN THE SEGARA ANAKAN MANGROVE WATERS, CILACAP, CENTRAL JAVA, INDONESIA*

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ABSTRACT

Investigation on the relative condition factor (Kn) and carapace length (CL mm) weight, (W g) relationship of 'Udang windu' *Penaeus monodon* FABRICIUS was carried out at Segara Anakan mangrove waters, Cilacap from December 1982 to November 1983. The relationships for males, females and combined were found to be : $W♂ = 10^{-3}\ 5.0761\ L^{2.3588}$, $W♀ = 10^{-3}\ 5.1485\ L^{2.3885}$, and W comb. $= 10^{-3}\ 5.1832\ L^{2.3521}$ respectively. The values of relative condition factor was found to be highest in smaller shrimp 21.0-25.0 mm CL of both sexes. High values of Kn were obtained up to 1.372 in males and 1.490 in females respectively.

INTRODUCTION

'UDANG WINDU' *Penaeus monodon* Fabricius (Decapoda : Penaeidae) inhabits estuaries and nearshore waters of mangrove forest in Segara Anakan Cilacap and support a major traditional fishery in Indonesia. The relationships of carapace length (Cl mm) to live weight have been found for 'Udang windu' from Segara Anakan mangrove waters (Toro and Sukardjo, 1987 a). It has been found that the monthly rainfall affects the density and abundance of those shrimp in that area (Toro and Sukardjo, 1988). Generally, the substrata of the Segara Anakan support the development of 'Udang windu' both ecologically and biologically (Toro and Sukardjo, 1987). But there is no information concerning the relative condition factor (Kn) of the "Udang windu" found in the Segara Anakan mangrove waters. Since the condition factor is importan for monitoring the environmental condition of the habitat of 'Udang windu', it is reasonable to evaluate those factors for better understanding of the ecology and biology of the 'Udang windu' in the Segara Anakan mangrove waters.

The purpose of this paper is to present the relative condition factor (Kn) and carapace length-weight relationship of 'Udang windu' from Segara Anakan mangrove waters, Cilacap, Central Java, Indonesia.

MATERIALS AND METHODS

'Udang windu' were collected from December 1982 to November 1983 from Segara Anakan mangrove waters (Fig. 1) by using 'Anco' (Stationed lift nets). Data recorded for each shrimp included sex, carapace length and weight. All specimens collected from the study area can be considered as adult shrimp.

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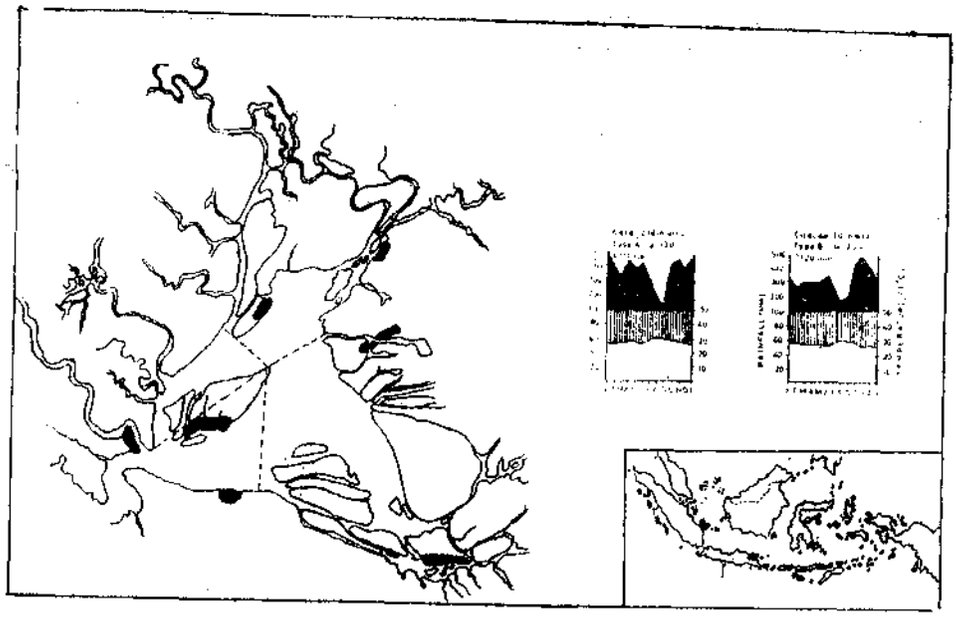

Fig. 1. The location of the study area in the Segara Anakan mangrove waters, Cilacap Central Java Indonesia.

The specimens ranging from 17.15-9.0 mm in carapace length and 4.8-94.2 g in weight were included in the present investigation. The analysis of relative condition factor and carapace length (X=L mm) — weight (Y=W g) data was done using the methods given by Thomas (1975).

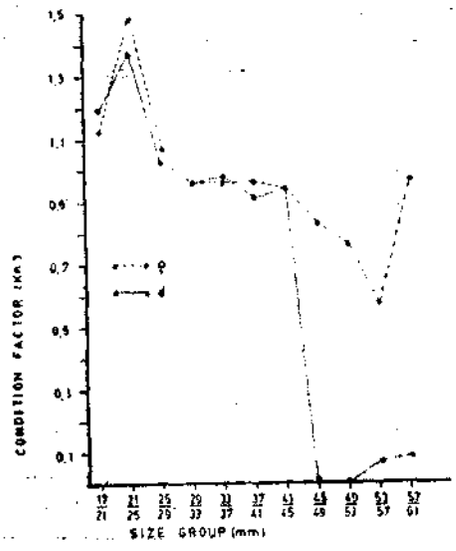

Fig. 2. Kn values in different size groups of *Penaeus monodon* in the Segara Anakan mangrove waters.

Result

Variations in the values of relative condition factors (Kn) in relation to size of adult shrimp are presented in Fig. 2. The values were found to be the highest in smaller shrimp (21.0 mm 25.0 mm CL) of both sexes with 1.372 in males and 1.490 in females. The condition factor decreased upto group size of 53.0-57.0 mm and increased at the carapace length size of 57.0-61.0 mm in females. The Kn values of male dropped to 0.0 due to no shrimp belong to the size group between 45.0-53.0 mm CL (Fig. 2). It is probably due to their moulting period or migration to favourable habitat to remain inactive. Generally, Kn value of the large shrimp was very low. It is suggested that the shrimp population in the Segara Anakan mangrove water

area will be entering to the moulting season and alternatively in the inactive period.

The Kn values showed no much seasonal variation in both sexes. It started increasing from April and it almost remained constant at 1.0 in May to November. There was a sharp increase in Kn from April to May only and was also very significant. A similar trend was noticed for males (Fig. 3).

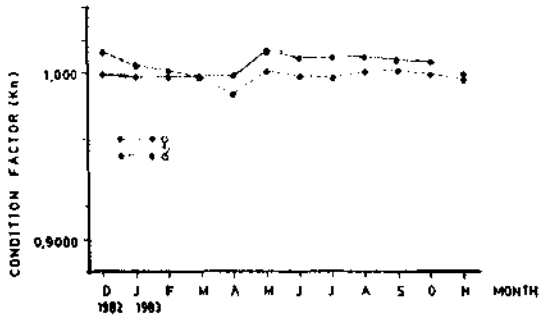

Fig. 3. Monthly variations in Kn value of *Penaeus monodon* in the Segara Anakan mangrove waters.

During rest of the period (October 1983-November 1983), the Kn values were found to decrease gradually in both sexes (Fig. 3).

Regression analysis on carapace length-weight relationship along with the test of significance have been presented in Table 1. It was seen that the female were heavier than males of the same carapace length and that this difference caused seasonal changes in the carapace length-weight relation.

Discussion

The present study showed that the fluctuation in Kn of *Penaeus monodon* Fabricius from Segara Anakan mangrove waters in relation to size appears to be influenced by the number of adult shrimps that have taken place in the Segara Anakan mangrove waters for some stage of their life period before migrate to offshore. In this event the shrimp appeared to have CL as much as 94.2 mm. Therefore, no 'Udang windu' spawns in the Segara Anakan mangrove waters. Furthermore, no seasonal fluctuation in the Kn were mainly due to the fact that the mangrove waters/areas represent a nursery and a feeding grounds for some stage of the 'Udang windu' life history. It means that in this period the population of 'Udang windu' mostly have smaller size. Highest Kn value (1.006) were recorded when the shrimp was in lowest size compared to the maturity stage. Similar observation have been made in *P. monodon* Fabricius population in offshore areas of Cilacap (Toro, 1983).

An increase in Kn value from April 83 to May 83 was possible due to the high rainfall (297-316 mm per month) which will affect the biomass of the 'Udang windu' (Toro and Sukardjo, 1988) as shown by increasing weight of the 'Udang windu' in this period from 20 g upto 72.5 g with a total individual amounted to be 16.33 % in April and 20 % in May of the

Table 1. *Statistics of regression of Log W on Log carapace length of* Penaeus monodon *Fabricius in the Segara Anakan mangrove waters*

Source	Regression Coefficient	SS due to Regression	Residual SS	df	Coefficient Correlation	F Table 5%	F Table 1%	F Cal
Male	2.3598	11144.88562	3707.787685	511	0.854*	4.93115	8.55925	1535.966197**
Female	2.3525	27689.5885	6868.382982	513	0.917*	4.95045	8.59275	2068.137281**
Combined	2.3521	75440.6941	10576.17067	1027	0.891*	3.95395	6.83982	7325.675358**

* Significant at $p<0.01$
** Very significant at $p<0.001$

total catch. The continued decrease in Kn indicated that certain amount of growth potential was sacrificed for females than in the males.

The Length-Weight relationship of the ' Udang windu ' in the Segara Anakan mangrove waters follow the cube law as the value of slope ' b ' were recorded always less than 3 in the present case.

In females, the value of ' b ' was high and in males it was low. In the maturity stage (Total Length=TL 129.6 mm for first stage of maturity). Toro (1983) found that the value of ' b ' higher *i.e.* 3.0493. During the spawning season, the total length of the ' Udang windu ' in offshore areas increased considerably resulting in an increase in total weight of the adult as well as a higher ' b ' value. For the Segara Anakan mangrove waters, considered as nursery and feeding ground of the ' Udang windu ', the lowest of ' b ' value reflect the status of the population of ' Udang windu ' still in transition period between adult (before migrate) and mature (before spawn) stages.

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