

LENGTH-WEIGHT RELATION AND CONDITION FACTOR OF
PENAEUS INDICUS AND *METAPENAEUS DOBSONI* IN THE
COCHIN BACKWATER

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ABSTRACT

Length-weight relation and condition factor of *Penaeus indicus* and *Metapenaeus dobsoni* were estimated using samples from Cochin backwater. Statistical tests support the view that the length-weight exponent of these species may be species specific. Condition factors (k) was estimated for both species and was quite high indicating the presence of adequate food in the environment. Condition factor was higher for *M. dobsoni* and it remained relatively constant with respect to size suggesting that the environment and food in the area sampled were more suitable for this species. Possibility of using k to assess the suitability of the environment is also suggested.

Key-words : Growth, dynamics, prawn, condition factor, Cochin backwater.

Nair, Iyer, Devi and Kutty (1982) observed that the length-weight exponent and condition factor of *Penaeus indicus* and *Metapenaeus dobsoni* were surprisingly constant under different levels of feeding. These prawns were fed with live earthworm and the frequency of feeding did not have any influence on the condition factor. The authors could not compare the experimental values with those observed in nature as the only published result was that of Hall (1962) for Malaysian waters. Length-weight relation and condition factor of *P. indicus* and *M. dobsoni* of the Cochin backwater were, therefore, studied to enable a comparison of the values and to assess the suitability of the area for the culture of prawns.

Samples of *P. indicus* and *M. dobsoni* were collected from the perennial culture ponds located near the Cochin harbour entrance for taking length and weight measurements. One hundred and forty-nine specimens of *P. indicus* and 88 specimens of *M. dobsoni* in the size range 2.2-7.5 cm and 2.2-8.5 cm respectively were measured. Since males of both species were rare in the samples, analysis was restricted to females alone. Since rostral length is subjected to wider variation, length measurements were taken from the base of the rostrum to the tip of the telson.

Length-weight relation : This was estimated using the formula

$$W = c / l^n \quad (1)$$

where W is the weight in gram, l is the length in cm and c and n , are two constants. The fitted equations for the two species are

$$W = 0.01115 / l^{2.97668} \quad (2) \quad \text{and} \quad W = 0.01288 / l^{2.82255} \quad (3)$$

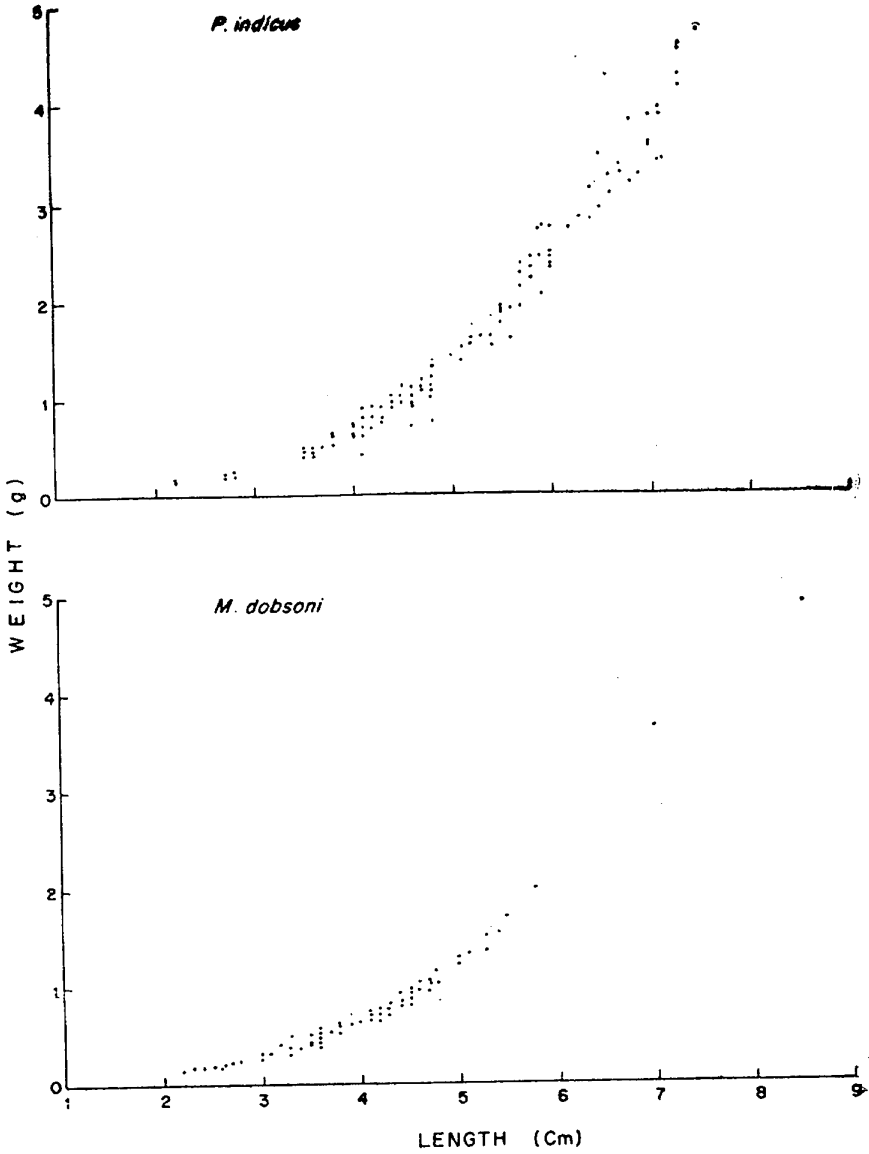


Fig. 1. Length weight relation in *P. indicus* and *M. dobsoni*.

The fitted curves are given in Fig. 1. As suggested by Krishnan Kutty (1972) possible error in the values of the constants due to inadequate representation of data is avoided by including adequate number of smaller size groups for estimating the length-weight relation. Since no significant difference between the values of the length-weight exponent under different levels of feeding were noticed, Nair, Iyer, Devi and Kutty made a combined estimate of the length-weight exponent for *P. indicus* and for *M. dobsoni*. The respective values were 2.95074 and 2.91023. Student's t-test was conducted to test significant difference between these values and those in equations (2) and (3). The t-test gave a t-value of 0.7156 and 1.9353 against 147 and 86 df for the two species, non-significant at the 5% level. The length-weight measurements were made by Nair, Iyer, Devi and Kutty on same individuals at weekly intervals over the experimental period whereas the present data were collected from natural environment. The small difference observed between the values of the length-weight exponents may, therefore, be expected since in nature, extraneous variations are bound to occur but it could perhaps be further narrowed if the weight measurements in the present study were taken to third or even fourth decimal place as done by Nair, Iyer, Devi and Kutty. Thus the present study tends to support their view that the length-weight exponent in these two species may be specific. To test this hypothesis further, more detailed data are being collected from three distinct environments in the Cochin backwater with prawns showing characteristic differences in the growth rate.

Condition factor: The condition factor, k was estimated for the two species using the relation

$$k = 100W/l^n \quad (4)$$

where W is the weight in grams, l is the length in cm and n , the length-weight

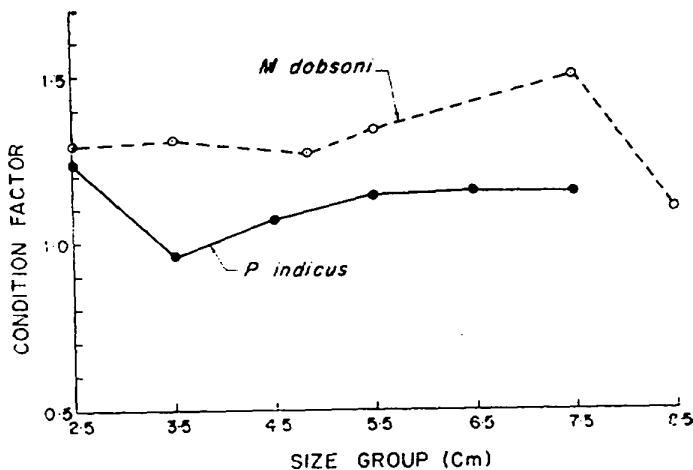


Fig. 2. Condition factor of *P. indicus* and *M. dobsoni* plotted against size groups.

exponent. Fig. 2 shows the change in the condition factor with increase in size. For the different length groups the k was averaged and was found to vary between 0.9592 and 1.2339 for *P. indicus* and between 1.0950 and 1.5030 for *M. dobsoni*. With increase in size, the condition factor for *P. indicus* after an initial decline from 1.2399 to 0.9592 increased again and remained more or less steady at about 1.14–1.15. In *M. dobsoni* it remained more or less steady at about 1.30 if lone specimens at higher length groups were excluded. The values were also slightly higher than that of *P. indicus* suggesting that the environment and even the availability of suitable food may be more favourable for *M. dobsoni* in the area sampled. It is also note-worthy that in both species the k values were considerably higher than those obtained by Nair, Iyer, Devi and Kutty. These authors agreed that their k values were low because the prawns were fed with live earthworm alone. Cochin backwater thus offered favourable environmental conditions for their growth. If the length-weight relation is carefully estimated, the condition factor can be a useful index not only of the quality of the prawn but also of the suitability of the environment for their growth. In the backwater there are areas with distinct differences in the nutrient concentration, composition of substratum, abundance of benthic organisms etc. (Sarala Devi, Venugopal, Remani, Zacharias and Unnithan — in press) and it may be possible to classify these areas on the basis of the condition factor and its seasonal variations. Experimental evidence to support the use of k as an index of environmental suitability is furnished by Nair, Iyer, Devi and Kutty. They found that when prawns were fed by live earthworm alone different levels of feeding significantly affected their growth rate but the condition factor remained surprisingly constant. This study shows how the quality of food is reflected on the ponderal index. More elaborate experimental and field observations will confirm the usefulness of this index for assessing the general environmental quality.

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