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LENGTH WEIGHT ANALYSIS OF *STOLEPHORUS INDICUS* OF KERALA COAST

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ABSTRACT
Fish has been the most important and the sustaining for the people around the world. Fish forms a major industry for many people in natural areas and supplying the raw material for many industries like manufacture of fish meal for a poultry and the production of oils of various kinds. Length-weight Relationship of organism reflects their pattern of growth, habitat support, feeding behavior, competition and survivability. The present study was conducted to determine the length-weight relationship of *Stolephorus indicus.* Usually the study on length weight relationship is assist in understanding the general wellbeing and condition of the fishes in aquatic life. The observed b value for the fish is 2.017 indicated an allometric growth of *Stolephorus indicus.* . In the present work the b value is deviating from the ideal b value, less than 3 therefore fishes exhibit a negative allometric length weight relationship it indicates that the fish tend to become thinner as they grow larger. The length-weight relationship in fishes can be affected by a number of factors including season, habitat, gonad maturity, sex, diet, and stomach fullness, health and preservation techniques, and differences in the length ranges of the specimen caught. The exact relationship between length and weight differs among species of fish according to their inherited body shape, and within a species according to the condition (robustness) of individual fish.

KEYWORDS: Fish, Growth, Habitat, length-weight, *Stolephorus indicus.*

INTRODUCTION

Fish has been the most important and the sustaining for the people around the world. Fish forms a major industry for many people in natural areas and supplying the raw material for many industries like manufacture of fish meal for a poultry and the production of oils of various kinds. India is the third largest producer of fish in the world and pisciculture is emerging as an important source of food. Rural areas in developing countries depend mostly on fisheries, poultry and animal rearing etc. at present in India, millions of people are suffering from malnutrition. However, prawns and fishes solve the problem of nutrition. Fishes are the cheapest food for the poor people. According to the central health survey fish contain highest nutrition value followed by eggs and provides balanced diet at cheaper rates (Narasaiaah and Rangaig , 2011).

Length-weight Relationship of organism reflects their pattern of growth, habitat support, feeding behavior, competition and survivability. Bio-morphometric and meristic studies of endemic, threatened or alien species are more important, enabling to make out strategic stands against their vulnerability. Invasive alien species (IAS) are re-garded as the second major cause for native and endemic species extinction globally (Wilcove *et al.*, 1998), introduced mainly for improving fishery, ornamental fish trade, bio-control of mosquitoes and sport fishing (Biju Kumar, 2010).The impact of invasive species on ecosystem is receiving much attention due to their detrimental ecological instability. The consequences of Aquatic Invasive Species are far reaching, including degradation of water quality, food-web disruptions, depletion of native biodiversity, as well as secondary economic impacts on fishing, tour-ism, and other related industries. The Western Ghats is home to some of the world's most unique fauna, flora and fungi, as compared to the other biodiversity hotspots.

The length weight relationship is an important tool in fish biology, physiology, ecology and fisheries industry and it has primary importance in setting yield equations. The length weight relationship for the fish stock is generally used to develop the mathematical relationship between two variables i.e. Length and weight, so if one of the variable is known the other can be computed.it allows the comparison of species growth between different habitat/regions and is required in fishery management and conservation (Erguden et al.,2011)the length weight relationship is used to assess the general well-being of the fish and the type of growth whether it is isometric or allometric. It is helpful in the study of fish population dynamics to estimate the potential yield (Prasad and Alli, 2007).

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Organisms generally increase in size (length, weight) during development. The key factors that influence the growth of fish are the quantity of food available, the number of fish utilizing same food source, temperature, oxygen and other water quality factors besides the size, age and sexual maturity of the fish. Every animal in its life exhibit growth both in length and in weight and the relationship between these two has both applied and basic importance. The length-weight relationship is one of the standard methods that yield authentic biological information and is of great importance in fishery assessments. It establishes the mathematical relationship between the two variables, length and weight, and helps in assessing the variations from the expected weight for the known length groups. This is particularly useful for computing the biomass of a sample of fish from the length-frequency of that sample. The parameter estimates of the relationship for a population of fish can be compared to average parameters for the region, parameter estimates from previous years, or parameter estimates among groups of fish to identify the relative condition or robustness of the population.

MATERIALS AND METHODS

The Indian anchovy (*Stolephorus indicus*) for the present study were collected from the fish market of kattakada during March 2018. A total of 50 specimens of the species were brought to the laboratory and total length to the nearest cm and total weight to the nearest 0.1g of individual fishes were measured using a measuring board and sensitive weighing balance respectively.

The Indian anchovy (*Stolephorus indicus*), also known as Hardenberg's anchovy, is a species of oceanodromous fish in the Engraulidae family

Kingdom: Animalia
Phylum: Chordata
Class: Actinopterygii
Order: Clupeiformes
Family: Engraulidae
Genus: *Stolephorus*
Species: *indicus*

Length-weight (log-transformed) relationships were determined by linear regression analysis using the data analysis package in MICROSOFT EXCEL. It was calculated for each 3 cm length category and for the total fishes collected. The length-weight relationship was worked out as per cube law given by Le Cren (1951) W=aLb Where, W = weight of fish (g), L = the observed total length (cm), 'a' is the rate of change of weight with length (regression intercept) and 'b'is the weight at unit length (regression slope).

The logarithmic transformation of the formula is

$$\text{Log } W = \log a + b \log L$$

When 'b' is equal to 3 isometric pattern of growth occurs, but when 'b' is not equal to 3, allometric pattern of growth occurs, which may be positive if >3or negative if <3.

RESULTS

The total length and weight of *Anabas testudineus* used in the present study varied from 7.8 cm to 8.5 cm and 18 g to 24.2 g respectively. Table I shows the data on length and weight of collected for the study *Stolephorus indicus* The length- weight relation of *Stolephorus indicus* is shown in the Fig. 2. Straight line relationship was found when the log values of the weight were plotted against the log values of length. The correlation coefficient (r) obtained was 0.511 .The b value obtained in the length-weight relation was 2.017.The correlation coefficient (r) obtained from the length weight analysis of was 0.5.11 which clearly exhibits the strong positive correlation between length and weight of the body of. *Stolephorus indicus* The b value obtained was 2.017. It was below the cube value of 3 and hence it implied that *Stolephorus indicus* showed a negative allometric growth. As the b–value less than 3, the growth of *Stolephorus indicus* was not proportionate in all directions.

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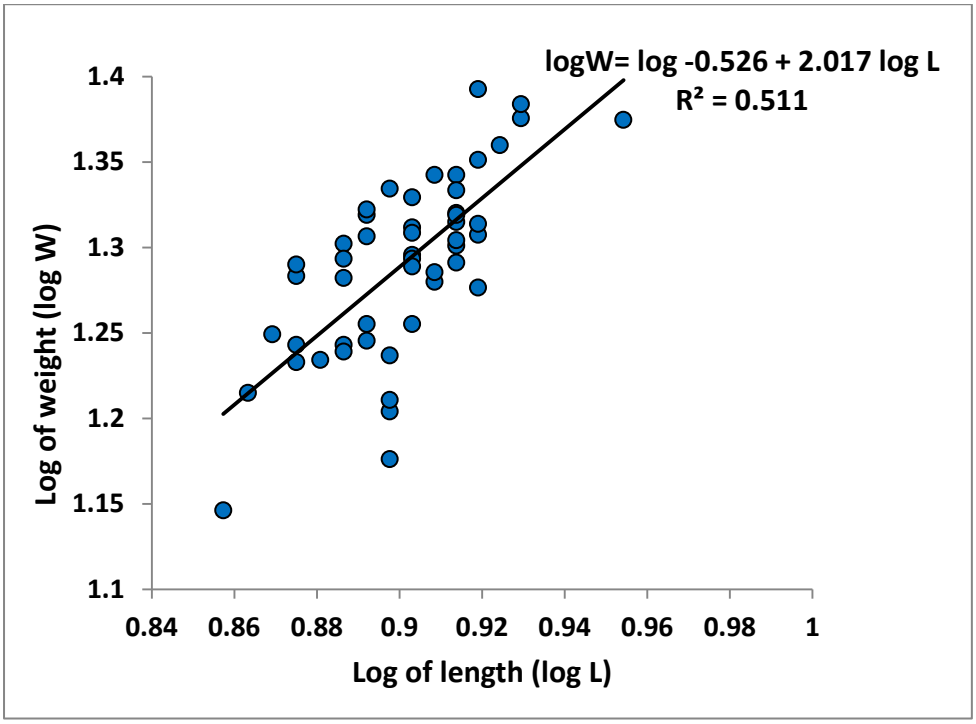

Figure 1. Length-weight relationship of *Stolephorus indicus*

DISCUSSION

The present study was conducted to determine the length-weight relationship of *Stolephorus indicus.* Usually the study on length weight relationship is assist in understanding the general wellbeing and condition of the fishes in aquatic life. The observed b value for the fish is 2.017 indicated an allometric growth of *Stolephorus indicus.* A study on *Vulugil scheli* by Moorthy et al (1999) reported the 'b' value was 2.62 which showed allometric growth pattern. The results of the present study are correlated with the results of Moorthy et al. Similarly Babu and Neelakandan, 1983 reported the 'b' value for male and female *Lisa parsia* as 2.9 and 2.98. All the reasons are at par with the present results.

The value of 'b' remains constant at '3'in an ideal fish (Allen, 1938), but under natural conditions the value of 'b' usually ranges between 2.5 and 4 (Hile, 1936; Martin, 1949). In the present study 'b' varied between 2.6328 and 3.2012 in the various size categories .However, the body shape of *Stolephorus indicus* tends to change as the length increases. This assertion was supported by Aliakbar and Ali (1978) and Nwani *et al*. (2006). According to the view of Kunda *et al*, (2008) that the fluctuations obtained in certain length groups might be due to variation in sample size, gonad conditions, seasonality and fullness of gut content. Length weights are two indices determining the age of the fish gonad development and estimating the growth of fish stock of assessment models and data for sustainable management resources

In conclusion, the present study found that the species of *Stolephorus indicus* inhabiting in marine water of kerala had negatively allometric growth pattern (b=2.0214). The sedentary form of habitat may influence the deviation of b-value from isometric value (b=3) due to stress factors in the habitat. Weatherly and Gill (1987) found that higher metabolic activity with spawning season lowers the 'b' value while less metabolic activities, accumulation of fat,weight of gonad etc. during the pre-spawning period increases the values. The closeness of 'b' values to 3 also suggests a healthy environment for the fishes with respect to feeding and growth.

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CONCLUSION

In the present study, relationship of *Stolephorus indicus* not followed the cube law. So the fish has not followed isometric growth pattern. In the present work the b value is deviating from the ideal b value, less than 3 therefore fishes exhibit a negative allometric length weight relationship it indicates that the fish tend to become thinner as they grow larger. The length-weight relationship in fishes can be affected by a number of factors including season, habitat, gonad maturity, sex, diet, and stomach fullness, health and preservation techniques, and differences in the length ranges of the specimen caught. The exact relationship between length and weight differs among species of fish according to their inherited body shape, and within a species according to the condition (robustness) of individual fish. Condition sometimes reflects food availability and growth within the weeks prior to sampling. But, condition is variable and dynamic. Individual fish within the same sample vary considerably, and the average condition of each population varies seasonally and yearly.

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