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ORIGINAL RESEARCH ARTICLE

Length-Weight Relationships of Marine Ornamental Fish Threespot Humbug *Dascyllus trimaculatus* Ruppell, 1829, from Gulf of Mannar, South East Coast of India

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ABSTRACT

The length-weight relationships of male and female were determined by regression equation. The regression equation derived for male was found as $Log_eW = 0.704 + 0.571\ Log_eX$, while that of female was $Log_eW = 0.605 + 0.589\ Log_eX$. Combined Logarithmic relationship between the length and weight in male and female was also calculated as $Log_eW = 0.664 + 0.562\ Log_eX$. From these equations it is clear that the 'b' values of both male and female were less than 1. Covariance on the length-weight equation was not significant between the regressions of male and female at 5 % level. It indicates that sexual dimorphism did not affect the length-weight relationships.

Key words: *D. trimaculatus*, male, female, length-weight relationship.

INTRODUCTION

The length-weight relationships are significantly important for management of fisheries used for comparison of growth and an empirical relationship like is an important piece of information in studying the natural history of fishes [1]. In fisheries research, length weight relation is required for the estimation of weight, where only length data are available and vice versa and it can also be an indicative of the condition factor, that is the general well being of fish population [2,3]. The length-weight relationships relationship also gives information of fish stock assessment [4,5,6]. It is also used to indicate some important events in the life history of fishes such as metamorphosis, maturity and condition [7]. The application of length weight relation and the mean weight of fish of a given body length and conversion of length– growth model to corresponding weight growth model, [7,8,9] reported that the basic information on length weight relation is of at most important, but often not available and scanty. The previously reported that the length-weight relationship of some marine fishes was represented by [8] has been reported that the of the Indian oil-sardine from Indian coast, [7] has been reported that the Indian oil-sardine, *Sardinella longiceps* from Indian coast, [10] has been reported that the Golden Scad, *Caranx kalla* from Mangalore coast. [3] has been reported that the commercially important marine fishes and shellfishes from Karnataka. [11] has been reported that the *Arius subrostratus* from a coastal wetland in Kerala. [6] has been reported *Chanos chanos* from tide-fed brakish water ponds of the Sundarbans. However, the length-weight relationship of *D. trimaculatus* has been not studied previously. Hence, in the present study the length-weight relationship of *D.trimaculatus* was carried out with the objective of providing a set of estimated equations, and to determine whether any difference exists in these relationships in males and females.

MATERIALS AND METHODS

The length-weight relationships of *D. trimaculatus* from the coast of Gulf of Mannar, South east coast of India were studied between 2009 & 2010. The samples of 35 males ranging in size from 82 to 140 mm and 36 females ranging in size from 82 to 135 mm of the test animal of fish *Dascyllus trimaculatus*, used for the present study were collected. The length was measured from the

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tip of the rostrum to the end of tail using a vernier caliper and the weight was measured to the nearest 0.01g using an electronic balance. The length-weight relationship was calculated separately for both sex as well as pooled. The logarithmic equation for this relationship is log e W = log e a + b log e L i.e., Y = a + bX, it is followed by standard methods, where 'W' represents weight in gram and 'a' and 'b' the constants, which were estimated by the method of least squares.

The linear equation was fitted separately as well as pooled for males and females of *D. trimaculatus* analysis of covariance (ANCOVA) was employed to test the significance of difference between regression coefficients (b) at 5 % level of both sexes [4,5,6] .

RESULTS

The log values corresponding to the length and weight of males and females are plotted in the (**Fig 1 & 2**). The regression line obtained showed a linear relationship between the two variables. The regression equations derived for each sex are given below.

Male : Loge W = 0.704 + 0.571 Loge X

Female : Loge W = 0.605 + 0.589 Loge X

The combined logarithmic relationship between the length and weight in male and female of this species is plotted in (**Fig 3**). The results of analysis of covariance on the length-weight equation revealed not any significant differences between the regressions of males and females at 5 % level ($F = 3.54$) ($P < 0.05$), so the regression equation for males and females combined together was also calculated as follows.

Pooled : Log W = 0.664 + 0.562 Log X

Fig 1: Logarithmic relationship between the length and weight in male *D. trimaculatus*

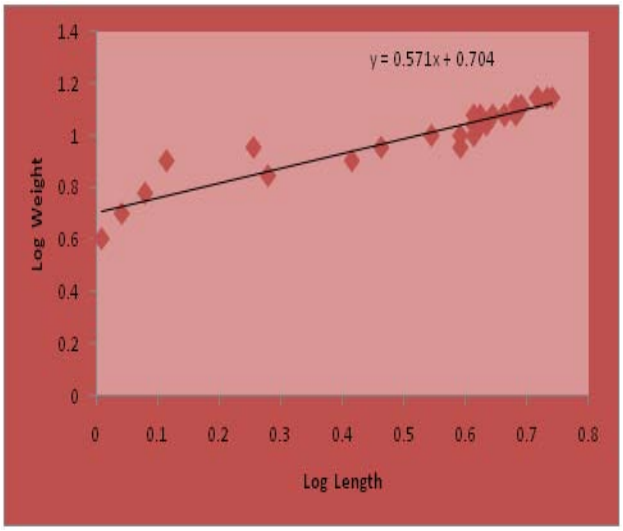


Fig 2: Logarithmic relationship between the length and weight in female *D. trimaculatus*

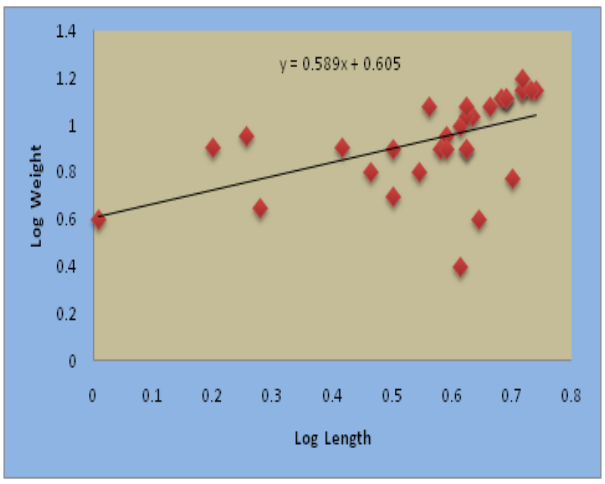
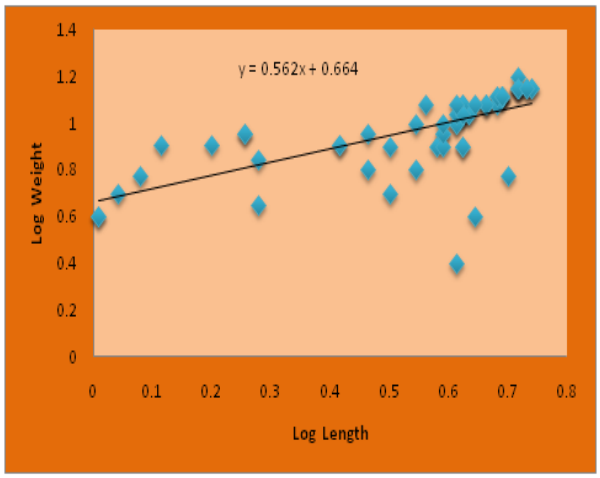


Fig 3: Logarithmic relationship between the length and weight in *D. trimaculatus* male and female as combined



DISCUSSION

The length and weight relationship are a helpful and good result of fish analytical programs. These data are significantly very much needed to estimate growth rates, length and age structures and exploitation of fish populations. Recent report the food from land so limited, while the people like in seafood, however the harvesting of natural fisheries resources has declined due to the overexploitation, since the reason of unlimited catches of fishing grounds. So the wild fish catches day by day decreases, while the seafood demand the people like in farmed fish. It is supply one third of the seafood that people eat worldwide and that fraction is increasing. The aquaculture one of the fastest growing food production sectors in the world and forms a large part of the global solution to environmentally sustainable food production [12]. The length - weight relationship is also significantly important for studies on maturity and yield estimates by analytical models. In the present investigation of the weight of the fish is a function of length. Information on length-weight relation is essential for studies on growth

and sexual maturity of animals [13]. Here this study was done with the aim to explain the mathematical relationship between two variables namely the length and the weight, so that if one is known, the other could be computed easily. The results from the present study revealed the length-weight relationship of *D. trimaculatus*. This provided a set of estimated equations and to determine whether any difference exists in these relationships in males and females. The regression equations derived for male was found as Log W = 0.704 + 0.571 Log X, while that of female was Log W = 0.605 + 0.589 Log X. Combined logarithmic relationship between the length and weight in male and female was also calculated which was as found as Log W = 0.664 + 0.562 Log X. From these equations it is clear that the 'b' values of both males and females were less than 1. Even though, the value based on size was not noticed, hence one common equation each for males and females was calculated and the result clearly indicates that the males are larger than females of same age group. The female can be dominating the male in all other body measurements. Hence in the present study, the ornamental fish *D. trimaculatus,* it is affected by a number of biotic and abiotic factors in wild and culture systems, such as habitat, gonad maturity, diet and stomach fullness. In the study of length - weight relationship information useful for the fish stocks, estimation of the age and weight, growth and mortality rates, population dynamic and also very much useful for management and conservation strategies.

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