



# Length-Weight Relationship of Pugnose Pony Fish *Secutor insidiator* (Bloch, 1787) (Family: Leiognathidae) from the Visakhapatnam Coastal Waters, North East Coast of India

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## Abstract

The length-weight relationship (LWR) was estimated using the exponential equation  $W = aL^b$  for one species of ponyfish belonging to family Leiognathidae, species *Secutor insidiator* in the catches of Visakhapatnam landing centre. The LWR was worked out as in pooled samples  $W = 0.0000170 L^{2.9143}$ , in females  $W = 0.00000369L^{2.7976}$ , in males  $W = 0.00000352 L^{2.8920}$ .

**Keywords:** Length-weight relationship, pugnose ponyfish *Secutor insidiator* (Bloch, 1787), Visakhapatnam coastal waters, north east coast of India.

## Introduction

Silverbellies (Family: Leiognathidae, Order: Perciformes) commonly known as slipmouths or ponyfishes<sup>1</sup>. It's constitute important component of the marine fisheries exploiting the coastal fishing grounds in the Indo-Pacific and Western Central Atlantic Oceans and widely distributed inhabiting sandy, muddy and estuarine environments in the tropical and sub-tropical Indo-Pacific Ocean<sup>2</sup>. This silverbellis species is commonly familiar by its downward protractible mouth and is commonly available in shallow coastal waters, estuaries and mangrove areas<sup>3</sup>. It is one of the majority's commercially important "by-catch" fish species due to high quantity of bone and fat less flesh that provide plenty of calcium and protein sources<sup>4</sup>. Fisheries information is scarce for the species represented in different regions<sup>5</sup>.

The length-weight relationship studies (LWR) is an important tool in fish biology, physiology, ecology and fisheries assessment<sup>6</sup>. It can be used for converting lengths into biomass, determining fish condition, comparing fish growth among areas, and as a complement to species specific reproduction and feeding studies<sup>7-10</sup>. Thus, if it is properly calculated, it can be very useful to fisheries management. Length weight relationship studies useful references for coastal water management and particularly marine fisheries<sup>11</sup>.

## Material and Methods

Samples of pony fish species were collected from the commercial trawlers operating in the catches off Visakhapatnam fish landing centre, North Andhra Pradesh, East coast of India during the study period September 2012 to August 2013. Total length in mm and weight in grams (from tip of snout to the tip

of longest ray in the caudal fin) and weight (nearest to 0.1g) were recorded.

The length-weight relationship was calculated by the method of least square adopting the equation of<sup>[12]</sup>.

$$W = a L^b$$

Where: W= Body weight (g), L= Total length (mm); 'a' is a coefficient related to body and 'b' is an exponent indicating isometric growth when equal to 3<sup>13-15</sup>. The same in the logarithmic form can be written as:

$$\log W = \log a + b \log L.$$

In the present study samples used for LWR includes sexes were considered separately represented in the catches.

## Results and Discussion

The LWR was worked out as in pooled samples  $W = 0.0000170 L^{2.9143}$ , in females  $W = 0.00000369L^{2.7976}$ , in males  $W = 0.00000352 L^{2.8920}$

Total 3647 specimens of the length ranged from 80-115mm in males, 66-114mm in females and 27-115mm in pooled. The weight range in males is 8-20gm, in females 4.5-21.5gm and in pooled 0.2-21.5gm respectively. The regression coefficient (b) for *S. insidiator* was found as 2.9143 which differs significantly from hypothetical value (3), indicating negative allometric growth. Generally, the condition of isometric growth, the weight of the fish is considered as an exponential function to length and their relationship could be expressed by the cube-law, i.e., weight = a x length<sup>3</sup>. The results indicated that *L. jonesi* and *L. decorus* displayed similar rate of changes in length and weight with allometrically positive population growth

pattern ( $b > 3.0$ ), Whereas the other two smaller species *L. oblongus* and *S. insidiator* displayed a relatively difference rate of changes in length and weight with allometrically negative population showing growth pattern ( $b < 3.0$ ). The “b” values also changes due to changes in physiological growth condition such as development of gonads or food availability for the respective population<sup>12,16</sup>. In view of the importance of length-weight relationships in understanding growth and stock dynamics of fish populations, it has been extensively studied in several species of fishes distributed in different parts of the world. Length-weight relationships in silverbellies have been derived from the Indo-Pacific regions, and the Indian sub-continent has been a major site for study of these fishes<sup>17</sup> gave detailed statistics of the length-weight relationship in *L. dussumieri* from the Gulf of Mannar, reporting ‘b’ values of 2.9591, 3.1732 and 3.3976 for males, immature females and mature females, respectively<sup>18</sup>. Batcha and Badrudeen have been reported that the value of ‘b’ is to be 3.004 for *L. brevirostris* from the Palk Bay<sup>19</sup> described the relation between length and weight in *L. jonesi* from Palk Bay reported value of ‘b’ is to be 2.87. According to the studies of Balan<sup>20</sup> the reported ‘b’ value is to be 2.864 for *L. bindus* from Calicut coast of Kerala<sup>21</sup>.

Nagarajan, derived the length-weight relationship in *L. berbis*, *L. dussumieri*, *S. insidiator* and *G. minuta* from the Tuticorin coast, estimated the ‘b’ values are to be 3.0717, 3.1245, 3.3032 and 3.0624 respectively. The length-weight relationship in *L. bindus* has been described from the Kakinada coast (Murty)<sup>22</sup> and the West Bengal coast<sup>23</sup>. From Parangipettai, Jayabalan and Krishna Bhat<sup>[24]</sup> reported ‘b’ value of different stages of *G. minuta* which ranged from 2.5939 to 3.1629. The ‘b’ value was reported to be 2.97 from Kakinada and 3.286 from West Bengal<sup>25</sup> Jayabalan, derived the length-weight relationship in *S. insidiator* from Porto Novo and reported ‘b’ to be 2.864 and 2.906 for males and females respectively. Studies of Mazlan and Seah<sup>26</sup> from Malaysia, reported ‘b’ value of *S. insidiator* as 2.457<sup>27</sup>. derived the length weight relationship of *S. insidiator* from Cochin, Kerala and reported ‘b’ value as 3.463.

In the current study, the value of ‘b’ for *S. insidiator* derived was 2.9143. Studies of<sup>28</sup> Froese and Pauly the value of the regression coefficient ‘b’ reported for Silver bellies from other parts of the Indian Ocean and Western/Central Pacific Ocean as listed and are seen to range mostly between 2.5 and 3.4.



Figure-1  
Map showing study area

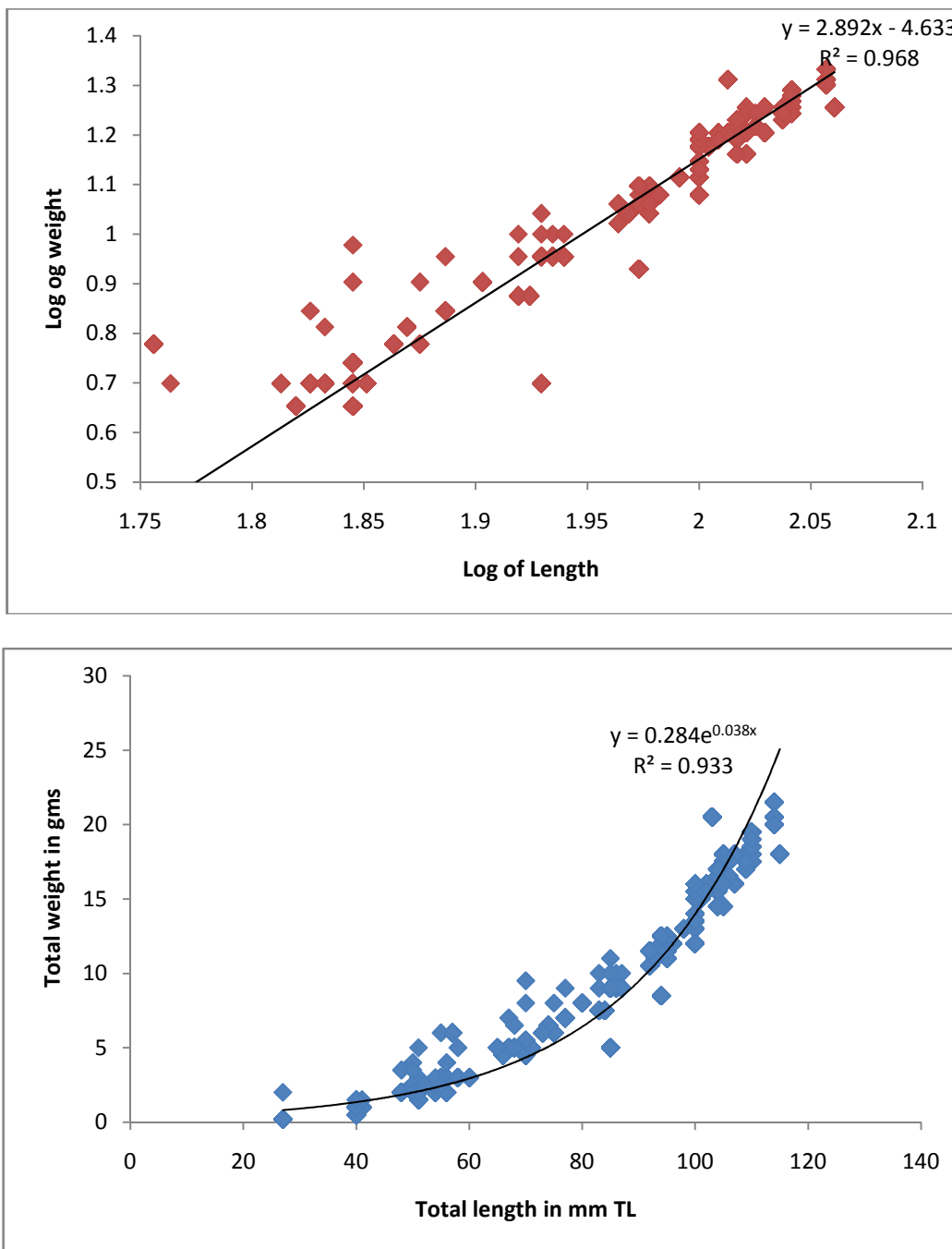


Figure-2

Length weight relationship pooled samples of *Secutor insidator* represented in the catches of Visakhapatnam. a. Original data; b. log transformed data

### Conclusion

Present study showed that pugnose ponyfishes community in the Visakhapatnam fishing harbour contributed one of the major by-catch compositions in the trawler operations. The rate of exploitation on pony fish community in the Visakhapatnam coastal water is believed at crucial stage of which can result in

recruitment overfishing phenomena.

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